

## Roosting



Something, somewhere,  
sometime



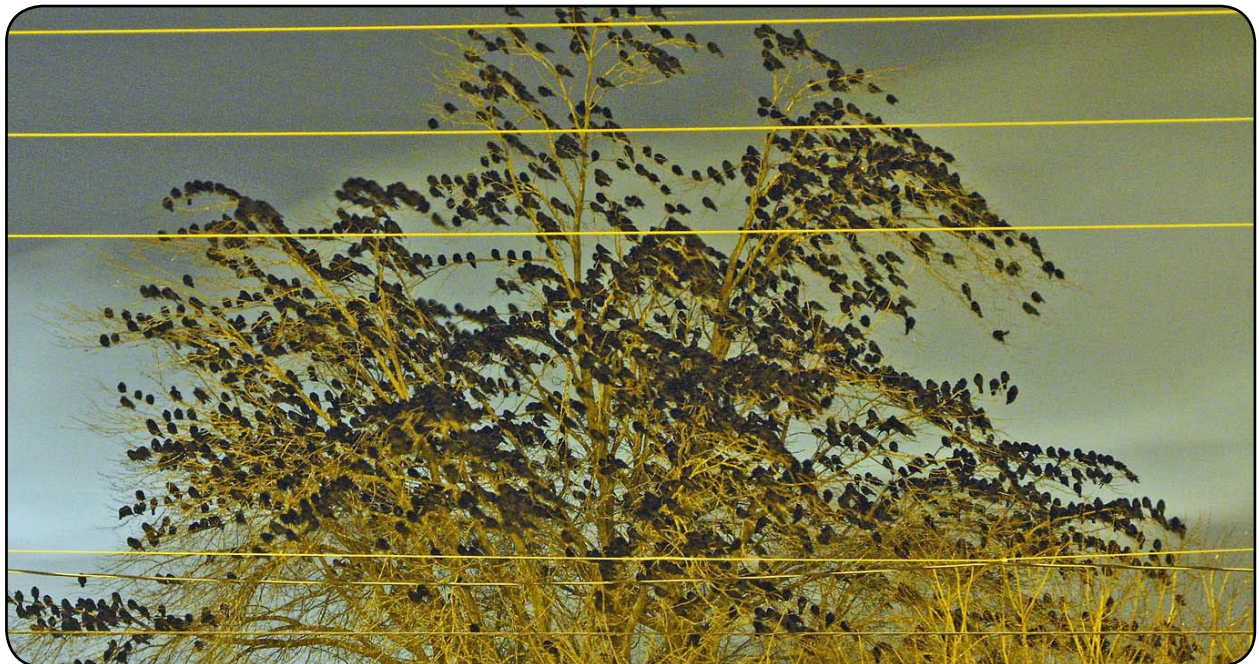
# ROOSTING

## 14

**S**UNSET. Against the rich, cadmium orange horizon, the crows and trees are pure blackness. Above the roost, five thousand crows are wheeling, dancing, breaking apart, rejoining. Three large cells swirl in different planes, in opposite directions. Tight dense pockets form like schools of herring, but swim through the thinnest water of all—vapor. Six hundred crows dive and join the assembly on the ground, on the ploughed field of darkness. Two hundred rise as one from that same darkness and are instantly alive against the brilliant, unalloyed orange. For twenty minutes the crow molecules vibrate above the trees. Higher up, two stars, unmoving and untwinkling in the flat, dark blue, stare without feeling at 100,000 perfect black crows. My vision absorbs the birds completely. Through my eyes I can see them, hear them, and feel them. The crows are expressing themselves. I stare in amazement; I look with pleasure. I have not seen anything better.

The natural tendency for crows is to form flocks. They are social animals. Each winter communal roosts form in remembered areas – a woodlot, along a riverbank, or an urban block. At dawn the birds wake, call for a while, then depart from the trees over a period of 20–60 minutes. Feeding is the order of the morning. During the afternoon, crows slowly head back toward the roost. Well defined flyways develop and coalesce to form large pre-roosting assemblies in trees and on the ground. Finally, a few assemblies, shrouded in near darkness, make the final short flight and unite into one large roost for the night.

During the breeding season, those birds not nesting, and some that do, also form small roosts over the summer. In **Illinois**, a flock of 75 birds was reported on 15 May, a roost of at least 1,000 birds in late June, and another of at least 500 crows on 15 July 20<sup>b</sup>. At Hamilton **Ontario**, where several thousand crows spend the winter,





Crows benefit farmers by feeding on mice and insects in harvested crops in southern **Ontario**

hundreds of crows roosted over the summer in the same deciduous trees along the same part of the north-facing escarpment occupied in the winter. At least 1,000 crows roosted at Hamilton on 2 August 1979 109.

Higgins first heard the calls of juvenile crows at summer roosts in **Ohio** during the first week of July. At another roost in Ohio, crows increased from 150 birds in June to about 340 by the start of August, then decreased rapidly during the next two weeks 934. In **Iowa** in July, adjacent crow families began forming overnight roosts. The crows arrived at the roost from as far as 20 km away where they fed during the day on their familiar nesting territories s33. In and around Ithaca **New York**, both urban and rural crows left their summer territories and formed winter roosts in either habitat. Other marked breeding American Crows foraged with flocks in the day and roosted as family units on their territory at night m85.

Small roosts in the early fall created by crows migrating in the northern latitudes are largely temporary. They soon disintegrate as crows continue to migrate south in September and October.

Along the sandbars flocks  
Of white egrets roost,  
Each one clenched like a fist

– Tu Fu r47

## Historical Roosts

### United States

**D**escriptions of roosts from the 1800s into the early 1900s by naturalists appeared in the journals, like the roosts themselves, widely scattered. One of the earliest entries was in the personal journal of the botanist William Bartram who lived on a farm 12 km from **Philadelphia**. His brief entries ran from 1802–1822, which he began at the age of 63. His records apparently referred to a roost at Merchantville **New Jersey**, a little east of Philadelphia 62s –

**1805** February 2, “large flights of Crows pass morning & evening to & from their roosts.”

**1822** February 22, “flights of Crows passing to NE.”





Also in the 1800s, a large roost existed on Pea Patch Island in the Delaware River. A violent storm and rising tide combined to drown the crows as they slept on low reeds <sup>04w</sup>.

**T**housands of them [crows] were seen next day floating in the river, and the wind, shifting to the north-west, drove their dead bodies to the Jersey side, where for miles they blackened the whole shore. This disaster, however, seems long ago to have been repaired, for they now congregate on the Pea Patch in as immense multitudes as ever.

The construction of Fort Delaware on the island in 1814 forced them to roost elsewhere. They may have moved to Reedy Island 11 km away, an island roost mentioned by Nuttall in his *Manual of Ornithology* <sup>n36</sup>. The number of crows roosting at Pea Patch and Reedy Islands was estimated at 500,000 <sup>61s</sup>. Lately, in the 1990s, from 5,000–12,000 pairs of herons, egrets and ibises nested successfully on the 125 ha Pea Patch Island, where Fish Crows, only one of their predators, kept them in check <sup>p16</sup>.



In the 1800s, American Crows roosted along the Missouri River Valley in **Nebraska**. On Hogthief Island about 50,000 birds roosted for at least 25 years. Their calling at daybreak could be heard 9 km away. The crows slept in cottonwoods and willows, or at times in small bushes and on large weeds <sup>t22</sup>. **Delaware, Maryland, New Jersey** and **Pennsylvania** had numerous roosts. A comprehensive description of crow behavior at roosts is available from Edwards in Volume 1, of the *American Journal of Psychology* <sup>e12</sup>, and from



Rhoads <sup>r49</sup>.

In Broome County **New York**, although no specific roost was mentioned in the late 1800s, the crow was a common resident and “winters with us in large numbers” <sup>c84</sup>. In Montgomery County **Maryland**, adjacent and north of Washington **DC**, “we are in the regular Crow belt, they breed here, the American as well as the Fish Crow, and congregate in vast numbers in winter.” When Langille arrived in the area in the 1880s, it was a common practice to slaughter American Robins for food during their spring and fall migrations. Then a law was passed which protected robins, and they returned and became less fearful of man <sup>l17</sup>.

Some of us watched crows in and around Staten Island **New York**. Crows roosted in **New Jersey** over the winter, and those from 2 or 3 roosts flew to Staten Island each day to feed along the shore. The return trip to New Jersey began from 3–3:30 PM depending on cloud cover. On sunny days, such as on the 25 of December 1893, the crows lingered a while before heading home to sleep. The flock numbered about 500 birds. When warm weather arrived, those crows not nesting, and probably some that did, formed two small summery roosts on the island <sup>d25</sup>.

From the late summer to early fall in the 1890s, in southwestern **Montana** around Bozeman, a roost of American Crows was active in the mountains 8 km south of Fort Ellis. About 500 crows passed over the camp morning and evening. The crows were so tame “one could approach them at any time within easy gun range, without resort to strategy” <sup>r62</sup>.

Around 1900, 15 wintery roosts of crows were identified in **Pennsylvania** and **New Jersey**.





**AMERICAN CROWS** A pre-roosting assembly in deciduous trees in southwestern **Ontario**, December

Coggins began by expressing his interest in this marvelous bird c95.

Whatever may be the final judgment of the farmer and the Department of Agriculture as to his economic worth, the Crow himself, his personality, has never been done justice. It is true that for the convenience of our own mind we have raised him to a copartnership with the industrious bee in the symbolic representation of a straight line. But with the farmer we have also written him as a destroyer of crops. We think of him as a rogue, a loud-mouthed roister, the personification of craft, of arrogance toward man and beast.

And yet in my own memory arises a very different vision. It is a snow storm on the Delaware meadows. All is white, and save for the wind, silent. A powdery snow sifts monotonously down from a gray, cloudy sky. Now caught up by a cold wind it is hurled into my face with a blinding force, before which I bend my head and close my eyes. Again with a sudden change of wind the air is cleared partially before me and I see the vague outlines of distant trees and even the dark lines of the river beyond.

Suddenly, and with no more noise than the flakes themselves, a thousand spectre-like objects

rise from the snowy ground before me. There is no outburst of indignation. They take wing wearily, as if in a stupor. They rise hesitatingly and struggle piteously against the wind. Some turn and are borne before it; others flutter vainly, waver and are swept backward by an irresistible force – thrown as it were into the drift beyond.

Crows? The shadows of Crows, rather! The spirit, the arrogance, is gone. Poor, starved, benumbed creatures. No wonder they do not resent my intrusion. Nature has taught them to endure suffering. This, then, is the other side of Crow-life. Buffeted by winds, at the mercy of snow and starvation and man, thus hordes of them perish each winter.

Roosts continued to grow. A Howell of the Biological Survey, identified one near Langdon **DC**, holding 270,000 wintering birds in 1910-'11 k06. In December 1918, Mr J Farquharson reported by long-distance telephone, a Logan County **Oklahoma** roost of about one million crows s17. Roosts existed on Staten Island, Long Island, along the Hudson River Valley, and in the Finger Lakes district of **New York** state. And near Rochester **New York**, an estimated 40,000 crows gathered nightly. The duration of the latter roost went back 15 years e03. **NOTE:** I visited Rochester

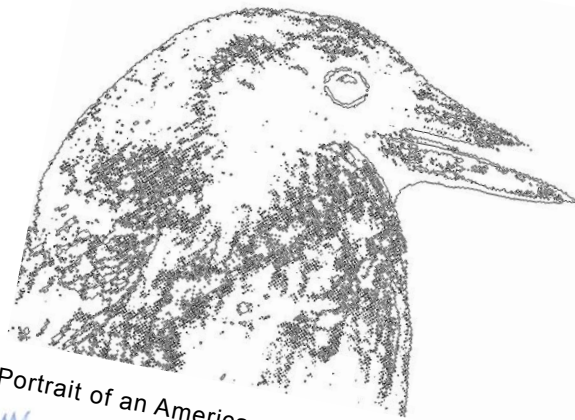




Young trees in the **Essex** roost bent from the weight of hundreds of crows sleeping each night over the winter



Saskatoon leaf in the fall



Portrait of an American Crow



Ligulate flower heads of Chicory





**New York** in the mid-1990s. Walking back from The George Eastman House of Photography one snowy evening, I was pleasantly surprised to see crows streaming by on their way to a nearby roost. This would indicate crows had been faithful to the Rochester area as a roosting site for at least a century. In 2011, a short video on the roost was posted, and it mentioned the plans by the ignorant city politicians to scare crows from the city of Rochester. Such ordinary thinking.

A large roost near Washington **DC** was

snow with a hole by the bill as the birds slept facing the wind w<sup>86</sup>. JW Preston wrote of a roost of 40,000 crows near Baxter **Iowa** where, in the severe cold of 1891–'92, the eyes of the crows froze b<sup>80</sup>. And crows roosting near Washington **DC** had their eyes frozen and eventually starved to death r<sup>76</sup>.

Around Bowling Green **Kentucky** in the 1920s, Mr G Wilson <sup>05w</sup> listed American Crows as common in summer and abundant over winter due to the presence of 3 great crows roosts –



Overflowing with verve, the crows at the **Essex** roost commanded my attention as they put on the best choreographed show in town. Whenever I stood by my truck and watched this courage of crows, I never noticed another human enjoying this lush theatre. An occasional human hunter was the only obvious predator

thought to hold 200,000 crows <sup>003</sup>. At Arlington **Virginia**, WB Barrows estimated 150,000 crows roosted nightly in the winter of 1886–'87 g<sup>75</sup>. Near St Louis **Missouri**, Arsenal Island in the Mississippi River was chosen by hundreds of thousands of crows as a good place to sleep. "The roar they make in the morning and evening can be heard for miles around, and the sight of the influx of these multitudes in the evening is something really imposing" w<sup>84</sup>. The crows at this roost spent a cold night on the snow-covered ground where each body left its impression in the

- (1) Nashville Pike near Lost River, 5 km from town
- (2) Jennings Creek, near a slaughter house
- (3) Morgantown Pike, 6 km from town

**N**ew York state's roosting crow population was interrogated at large by Emlen. The mid-winter 1932–'33 total population count came to 225,000 birds, from observers in almost all the counties. However, counts at roosts only represent one point in time. For example, at the roost in Tompkins County in December 1932,

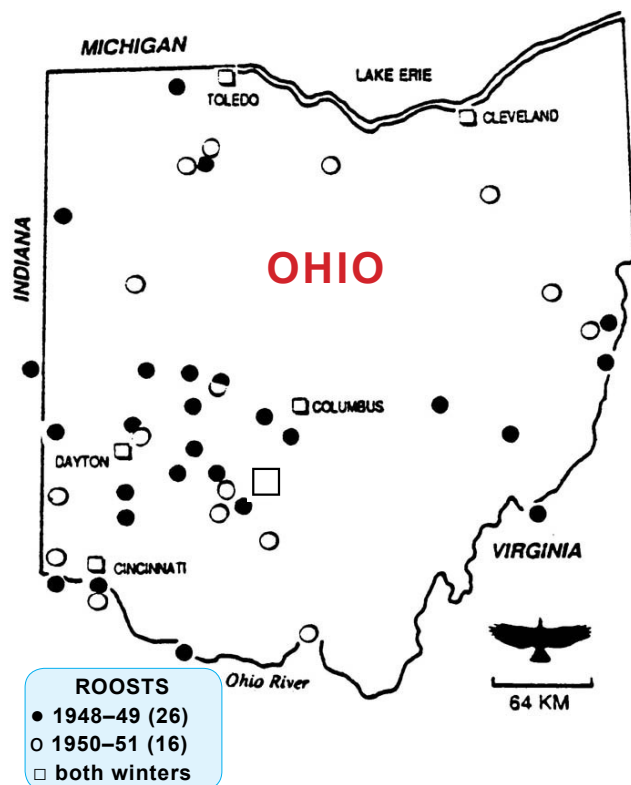




the number of crows went from 15,000 to 3,000 to 8,000 in one week as the weather changed. Throughout the state of New York, 20 separate roosts existed, with from 1,000 to 55,000 crows per roost. The territory utilized around a roost varied from 130–1,800 km<sup>2</sup>. This amounted to 20–30 crows per km<sup>2</sup>.

The crows roosted in a variety of deciduous and coniferous trees of different heights and planted in different patterns. The roosts were concentrated in two general areas of New York state e38 –

- (1) south of Lake Ontario from Niagara Falls to Rochester and throughout the Finger Lakes district
- (2) along the Hudson River beginning at its junction with the Mohawk River, south to New York and onto Long Island. Three roosts remained active on Long Island in the early 1930s.



**548.** Each dot represents the location of a roost of crows over the two winters of 1948–'51 in **Ohio** according to Ernest Good g34



**548a.** Each dot (70) represents the location of a roost of crows in the winter of 1938–'39 in **Illinois** according to Charles Black 20b

The roosts have been fairly stable in their location, in spite of changes in land use, crops, and human population. The unifying characteristics for the **New York** state roost locations were a preference by crows for areas near open water and below 300 meters altitude. As well, the early southern hardwood forest type synchronized well with present roost distribution. Chestnut, chestnut-oak, and Yellow Poplar attracted the crows several decades ago and the birds continued to home to that same area regardless of alterations to the land. No positive relationship between roosting and weather or crops was established. The amount of grain left in fields after the harvest was enormous. Waste corn may account for 50–60% of a crow's diet in winter. Yet only one of the 10 leading corn producing counties in the state supported an important, large





Hatred from our culture still plagues the crow's culture. Image 3rd-hand from the web – place, writer, and photographer unknown

roost. The county with the second highest corn production apparently lacked a roosting population of crows over the winter.

After checking past records, Emlen commented that in 1911 at least 15 of the present 20 roosts were in operation, perhaps not in the identical woods, but one close by. The roosting crow population utilized about 10% of the area in New York state. The number of crows on 259 ha of foraging area near the roosts ranged from 30–80 birds e38.

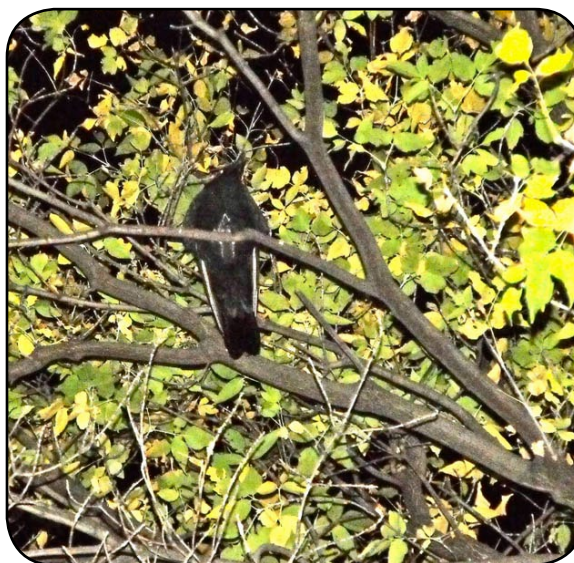
Next, Emlen scanned the crows in **California** throughout the winter of 1937–'38. Using many of the same techniques as in New York state, Emlen and his crew produced 393 reports indicating 82,000 crows slept in 68 roosts ranging from 50–20,000 birds per roost. The feeding densities around the roosts averaged 5–25 crows per 259 ha. After similar work in **Connecticut**, Emlen gave the average number of crows per 259 ha (2.59 km<sup>2</sup>) for the three states –

Connecticut 16  
**New York 4.6**  
 California 0.5

The relative smallness of CT may have produced a more accurate count of the crows. Emlen concluded crows innately returned to their familiar haunts for roosting and feeding in spite of abundant food, shelter and water in other locations e39. Around seven roosts in **Iowa** with 60–500 crows per roost, the birds foraged on an area of 26–166 km<sup>2</sup> averaging 1.6–3 crows per km<sup>2</sup> (per 100 ha) s33.

In **Illinois**, Mr Black mailed 2,400 questionnaires, and did some field work in the hunt for roosts of crows. Sixty-six winter roosts holding over 1,000 crows each, and 31 smaller roosts were located in the winter of 1937–'38. **Map 548a**, adapted from Black, gives the location of 70 crow roosts in the winter of 1938–'39. In total, about one million crows wintered in the state, and the largest roost had 100,000 members 20b. Two of the roosts were traced back to 1886–'87 from an earlier description b38. In **Chicago**, in the 1920s, the crow was one of the more common winter birds s16.

In Suffolk County, which occupies the eastern 2/3s of **Long Island**, three large roosts in the 1930s were active over the winter, one with 30,000 members 53c. In central **Oklahoma**, a few roosts held 200,000 or more avian members a11. Three kilometers south of Baton Rouge, on the west bank of the Mississippi River in **Louisiana**, was a roost of about 10,000 crows, and 48 km to the west was another of about 5,000 birds l32. Canvassing most of **Ohio**, E Good pictured the changing pattern of known roost locations (**Map 548**) over two winters (1948–'51) g34. In the winter of 1955–'56, from northern **Alabama** in the Tennessee River Valley, a roost of 250,000 crows formed i08.

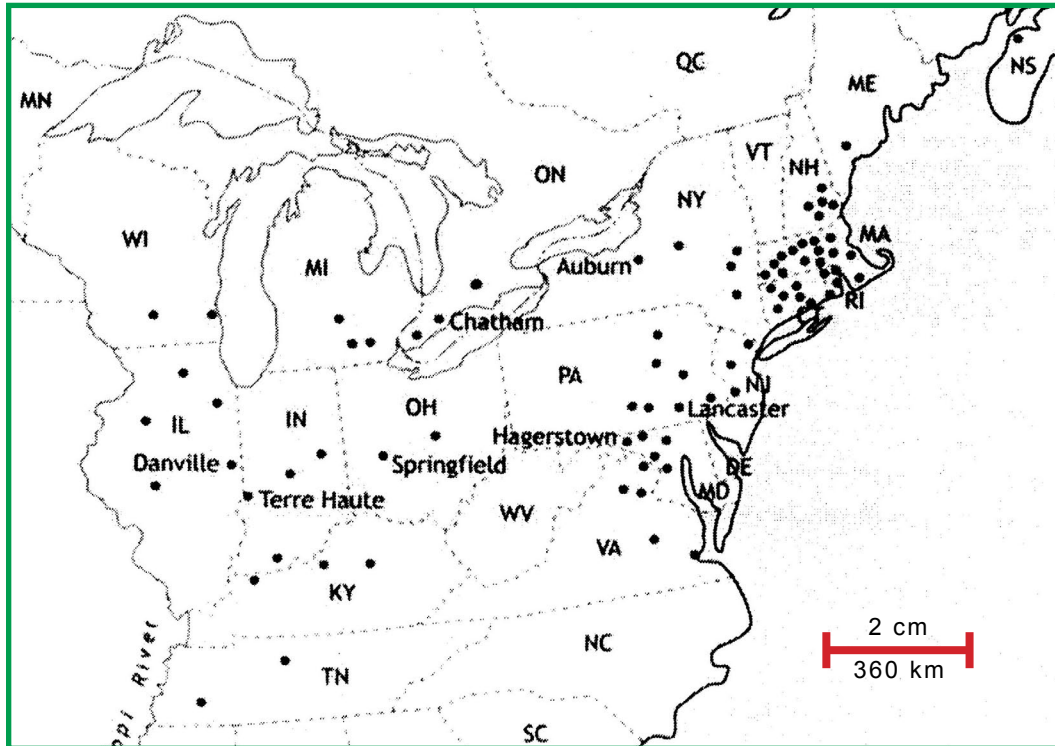


**Winnipeg** One crow roosting in a Manitoba Maple in September. The bird is balancing on its toe pads on the 2 cm wide branch near the top





## Major (> 10,000 crows) urban winter roosts in eastern North America



**550.** Large roosts (each dot), past or present of crows in cities east of the Mississippi River <sup>903</sup>. Cartography MK Gade

### Modern roosts

#### United States

With no intention of tracking down every roost, in 1985 I mailed a letter to 15 Conservation Departments in the United States, and half as many in Canada. Some of the departments' personnel spent considerable time crow watching; most, however, did not go out of their way for the blackshirts. Oklahoma and Kansas were probably the only states with individual roosts over one million birds. The Fort Cobb area, in Caddo County **Oklahoma**, going back to the 1930s and beyond, was associated with a magnificent overwintering crow population. From flyway counts, it was estimated the Fort Cobb roost held two million crows <sup>i01</sup>. In the 1980s, the **Oklahoma** Conservation Department estimated 4–6 million crows gathered over the winter near

Fort Cobb, which made it the largest crow roost in North America at the time. Eventually, the Fort Cobb State Park was established where hunting was prohibited. Presently, the roosting crows have shifted or disbanded. Few crows are now hunted in the Fort Cobb area (online). To the north, the **Kansas** Fish and Game Department was aware of two roosts, 85 km apart, in the multi-million bird category. The city of Wichita **Kansas** hosted nearly 100,000 crows. Holdrege in south central **Nebraska**, situated below the Platte River, was home for several thousand wintering crows. In the northern states such as **North Dakota**, crows were migratory and roosted only in the summer and fall <sup>946</sup>. No roosts with over 1,000 crows were reported from **South Dakota**.

In **Iowa**, the sizes of roosts decreased in the last 40 years, due to more intensive farming that fragmented large roosts <sup>s33</sup>. Roosts with up to 2,000 crows, some in towns, were scattered





**551. HAMILTON, ONTARIO** Red outlines the approximate area along the Niagara Escarpment where several thousand crows roosted in spots along a few hundred meters in deciduous trees on the north face of the steep cliff. Sometimes crows assembled on the cliff, then roosted in a small area outlined in red around City Hall and the Art Gallery of Hamilton in the winter, © Google Maps

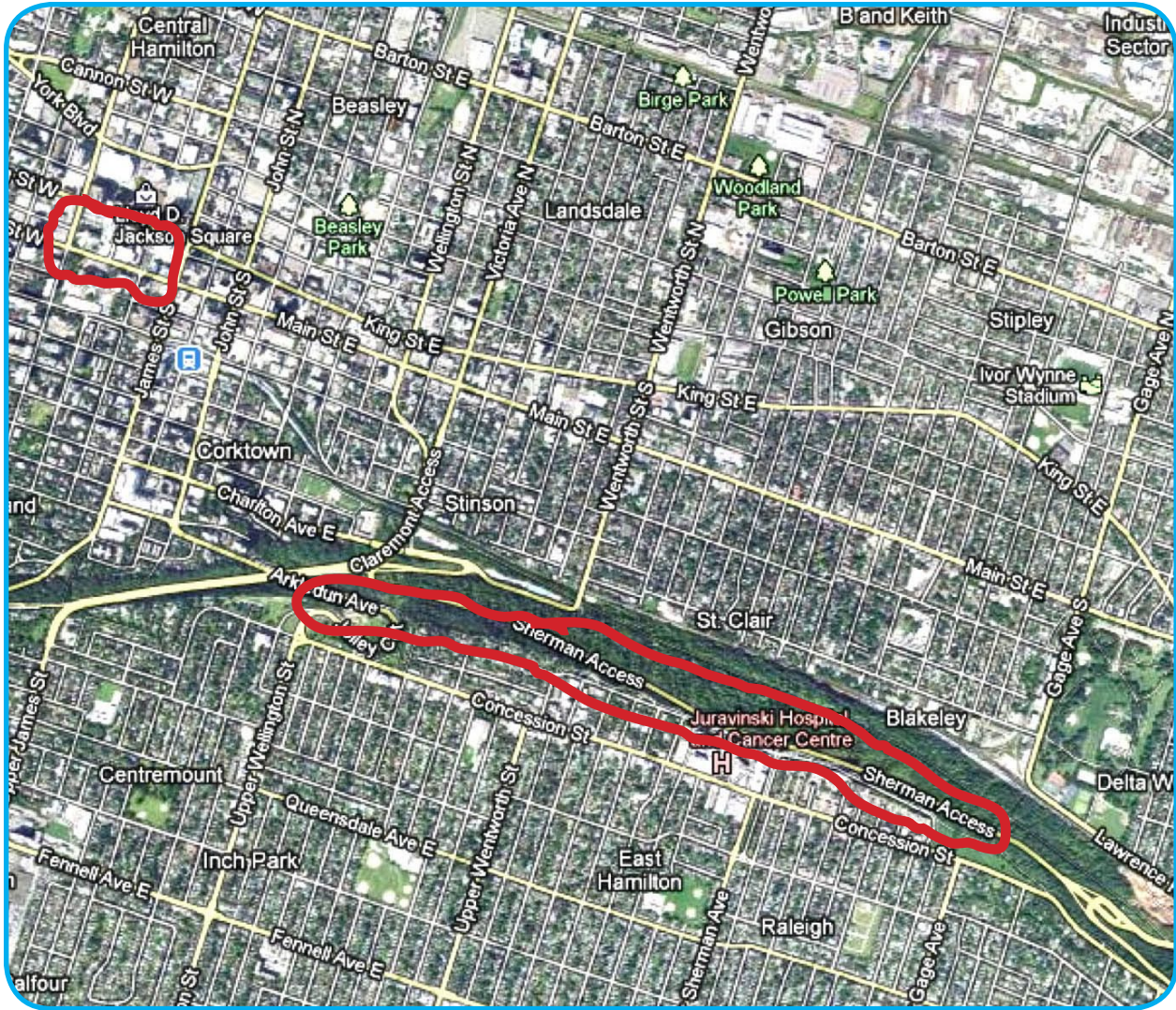
throughout the state. James Dinsmore (pers. comm. 1985) mentioned about 1,000 crows slept on the state university campus and have done so for at least seven years. The largest roost he was aware of held 17,000 crows in Koekuk, in the extreme southeastern part of Iowa along the Mississippi River.

Further south in **Missouri**, the Conservation Department, in a 1980 March report, listed 88

crow roosts. In more detail, there were 12 roosts of 1,000–7,000 birds for a total of 42,000 and 76 roosts in the 11–840 bird range totalling 8,000, giving a total figure of 50,000 crows for Missouri.

Below Lake Superior is **Wisconsin**, a dairy state harboring few wintering crows. A roost of 500 birds was large for that state. Slipping around the south end of Lake Michigan into **Indiana**, and while driving through the suburb of Greenwood in





**552. HAMILTON, ONTARIO** Over the winter several thousand American Crows assembled and often roosted (red outline) in sections of deciduous trees along the Niagara Escarpment in the 1980s. Sometimes the birds assembled on the escarpment, then shortly after dark flew to the area by City Hall and the Art Gallery of Hamilton (red outline) to spend a wintery night, © Google Maps

Indianapolis, a cove of 1,000 civilized crows spent a winter's night. The Indiana Department of Natural Resources was probably characteristic of many states in their handling of crows. Except where complaints about the bird were abundant, other species had a higher priority, leaving the crow to take care of itself.

**f**rom past records in **Illinois**, the state's crow population in the winter of 1907 was estimated at 4.8 million birds, which dropped to 1.4 million by 1957. In June the popula-

tion was 1.2 million crows in 1909 and 300,000 in 1957<sup>956</sup>. Earlier, Black estimated the state's winter population of crows at 1 million birds from about 100 roosts located during surveys in the 1930s (**Map 548a**). He also thought crows had different age and sex ratios from north to south in the state of **Illinois**. In late winter the ratio of adults to juveniles (HY) birds was 60 to 40 in the north, and 68 to 32 in the south<sup>19b, 20b</sup>. Others felt the differing ratios might be due to early migrating females and juveniles arriving from the south<sup>955</sup>.





In **Illinois** local, post-nesting crows began to form small roosts in August. By late October winter roosts were thriving. Roost locations from numerous crow watchers were listed g55. Overall, crows roosted in upland oaks, bottomland willows and cottonwood tree plantations, Osage Orange hedges in farmland, coniferous plantings and Catalpa groves. Crows also had a long history

decades. In Flatville **Illinois**, crows entered their roosting trees at 1 AM (01:00) to roost because of the harassment they endured early in the evening from local townspeople g55. Because of its declining wildlife habitat over the last 25 years, Illinois had informally been estimated to enjoy about 30% fewer crows. A few roosts in the 3,000–4,000 bird range developed each winter, and some of



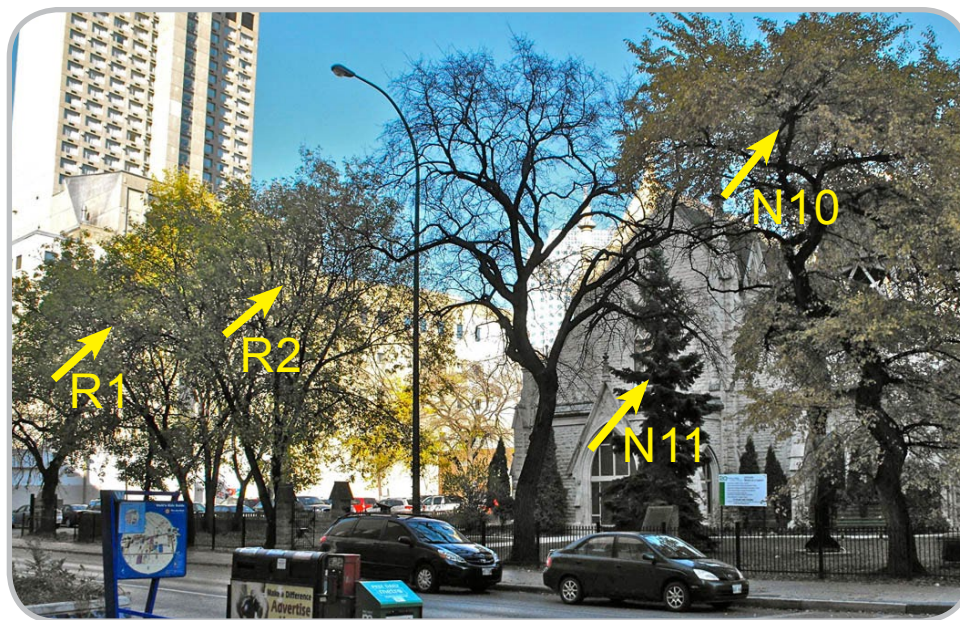
**WINNIPEG** On 3 April 2012, a breeding, unmarked American Crow roosted in a bare (leaves not yet open) American Elm by the main library. About an hour after sunset, the flash of the camera did not frighten the crow. The crow's mate? was in the same tree about 3 m away and at a different level. Both crows may have used the thicker limbs to conceal their outlines. They roosted lower in the tree than in the summer when there were leaves which hid them from above

of roosting in towns and cities, and this practice was increasing. For example, when trying to find roosts in 1982 from those reported in the 1930s in central Illinois, the closest roosts were in towns, and the number of crows was less than 10% of the 1938 counts. Many Osage Orange hedges used for roosting had been removed over the

them used the urban landscape as a dormitory (Moak, pers. comm. 1985).

Falling southeast into **Kentucky**, a few large urban roosts developed. Frank Boyd (pers. comm. 1985) of the Department of the Interior, sketched a picture of a roost with as many as 40,000 birds in Lexington, and another with about 10,000 in

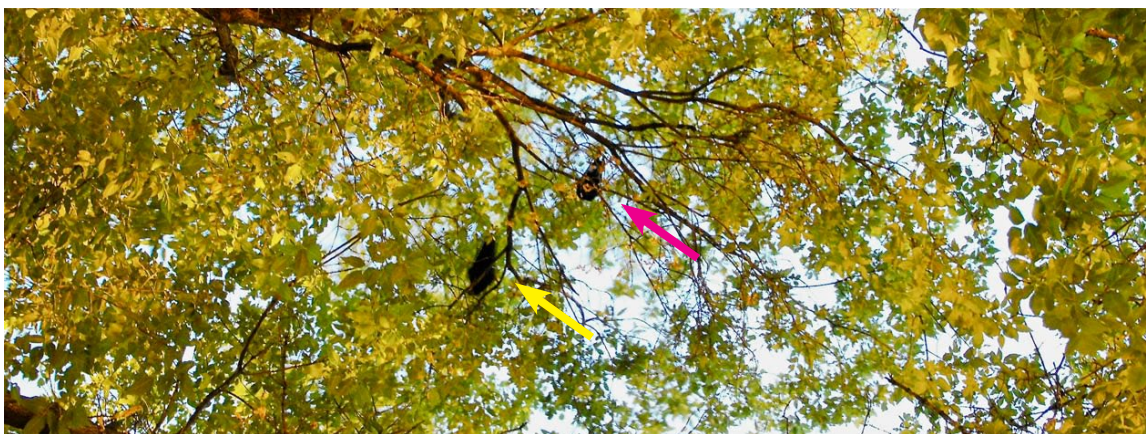




**WINNIPEG, MANITOBA** Nesting and roosting locations of an unmarked family of crows. **N10** was the successful nest in 2010 in an American Elm that fledged 3 young. **N11** was the successful nest in a Colorado Spruce that fledged 3 young in 2011. In September and October of 2011, the family of 4, then 3 birds, roosted in the two Manitoba Maples in the left half of the photo. Usually two crows about 1 m apart used the **R1** maple, and one crow slept in the **R2** maple. On the tall hotel in the upper left, Peregrine Falcons nested each year on an upper ledge. Note the central street light, 12 October 2011

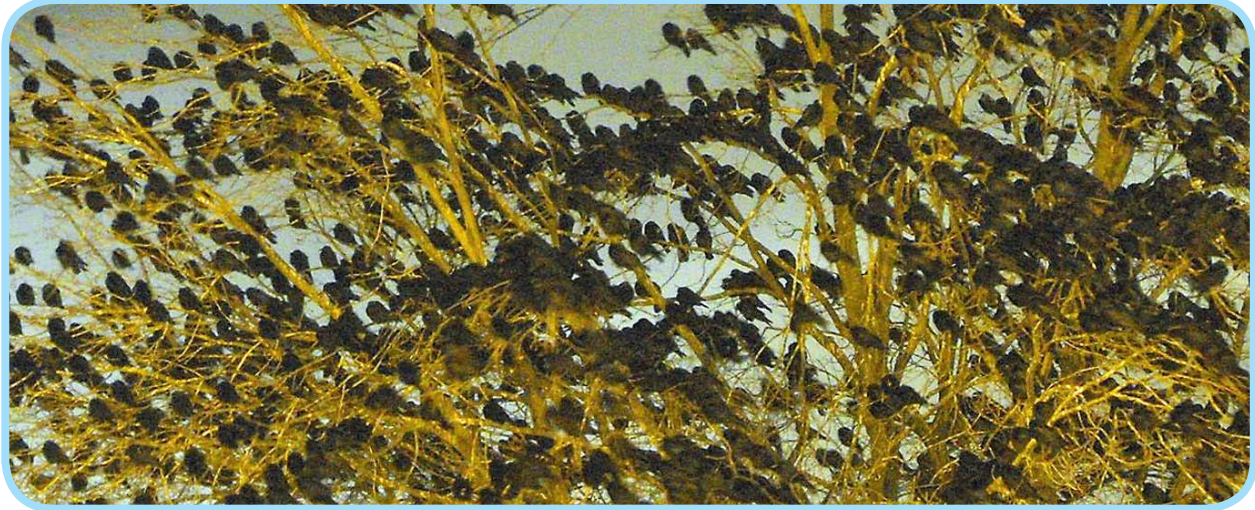
Louisville. The larger one was the most unstable in location. Crows used roofs of shopping malls, tobacco warehouses, deciduous trees in older suburbs, and a racehorse-track as sleeping quarters. Once the crows settled on the ground

of a golf-course for the night. A third roost was near the Ohio border. All three dormitories were located near airports and of concern to air traffic personnel. From the *Birds of Kentucky*, roosts existed in the central and western counties. As



**WINNIPEG, MANITOBA** A pair of unmarked American Crows, about 2 meters apart in the city on 27 August 2011, roosted in the upper quarter of a Manitoba Maple tree (dbh 18 cm) about 16 paces from their successful nest in a Colorado Spruce and 5 m from another maple (**R1** in picture above). Their roost was directly above a sidewalk leading to the Centennial Library. A street light illuminated their night. Wing stretching took place. Shit and regurgitated pellets splattered on the sidewalk indicated they slept at least several nights in this spot. Photograph [page 606](#)





**CHATHAM, ONTARIO** American Crows roosted in one of many deciduous trees next to a main road on 8 December 2011 at 5 °C. Dozens of trees, a harvested bean field, and an industrial yard within the city were used by this flock estimated at 50,000 crows

late as 26 April 1949, a large flock occupied open fields in Clark County, and on 5 May 1949, a flock of 31 crows in Warren County were headed to a roost 16m. After a day's drive to the northeast, one could find roosts in the southern parts of **Pennsylvania** holding 500–10,000 crows.

Every now and then a meaningful biological survey is repeated at a later date and the comparative results discussed. Earlier in this chapter I outlined the work of Emlen, who surveyed roost

sizes and distribution in **New York** state in the early 1930s e38. Crows in winter roosted in “tall, leafless poplars and oaks, groves of dense hemlocks, second-growth ash and maple, artificial pine plantations and even in orchards” e38.

Fifty years later, in the winter of 1982–'83, Charles Smith (pers. comm. 1986) repeated Emlen's survey. Using 50% more observers, almost twice as many roosts were found in the early 1980s, but Smith's total of about 52,000 crows was only 1/4 of what Emlen tallied in the early 1930s. No recent roosts over

9,000 crows were located, compared to one of 55,000 in the 1930s. Overall, there were fewer crows scattered over many more smaller roosts. Land-use alterations were suspected. Smith noted some cropland had reverted to scrubland and small woodlots, which may have reduced feeding opportunities for the birds. In spite of a great reduction in population size, the state's crows have shown a continued increase based on Christmas Bird Counts (CBC) from 1974 to 1983.

Along the west coast, a tradition roost in the late 1980s in Yuba City, Sutter County **California**, increased to an estimated one million birds. From 1970 to 1989 the winter population of crows in the Central Valley of California doubled. More crows were found in the Sacramento Valley than in the San Joaquin Valley of California 942.

In a recent survey of crows in **California**, respondents noted that 57 cities in 21 counties held roosts. Only one rural roost was known. In the 1930s, the roost survey in California by Emlen did not mention crows roosting in cities e39. Presently, most complaints are from people near roosts in residential and business areas of cities in California. Trying to control the birds resulted in 3 levels of success –

- (1) individual efforts 20%
- (2) group efforts 66%
- (3) large scale efforts 33%



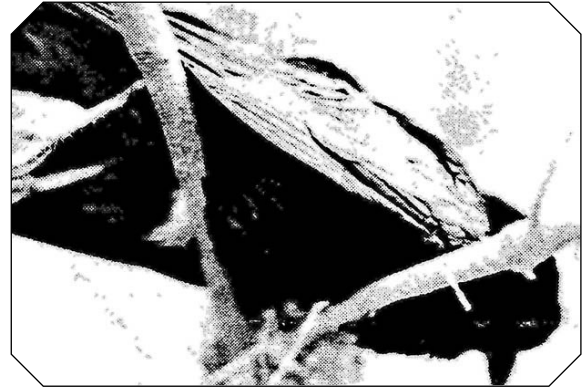


In the **Great Basin**, crows in winter used treed river valleys as they did for nesting in the summer. In **Utah**, however, crows migrated into areas not used extensively over the summer. Areas like Utah Valley, Cache Valley, Brigham City–Ogden area and the southwestern city of St George. In **Nevada**, summer crows were common residents in the western part of the state and appeared to remain all winter without a noticeable increase from migrants. Crows in the Great Basin roosted close to water, in dense clusters of willows and Salt Cedar, *Tamarix pentandra*, a tree less than 5 m tall. More specifically, in the winter of 1965–'66, a flock of American Crows roosted in the conifers in a cemetery in Provo **Utah** 53. About 1,000 crows slept in hackberry in Slide Canyon, Utah County 50.

From a national survey in the 1990s, urban roosts were reported from 24 of the 39 states responding. In three eastern states, Connecticut, Massachusetts and Rhode Island, 32 roosts were disclosed 946.

### Counting crows at roosts

When the number of crows in one location ex-



As I slowly walked through the **Essex** roost in the morning, a dead crow, resting on 2 branches, appeared

ceeds 1,000 birds, an estimate or guess was the usual way of determining the number of birds. Without training, field workers lack the skill to quickly count large numbers of flying or perched birds. Estimates of simulated modest numbers (200–6,000) of densely nesting birds in vegetation were checked by using a scaled physical model of a wading bird colony. The results indicated “Observer estimates averaged 29% less than



**ONTARIO** Thousands of hectares of field corn and soybeans provide waste grain after the harvest which feeds thousands of American Crows roosting over the winter in southwestern Ontario. Crows also eat millions of larvae of European Corn Borer from inside the corn stalks all winter, giving free sustainable biological control to farmers. December 2011





true numbers (under- and overestimates averaged together), and the mean absolute value of observer errors was 49% of true values” f66.

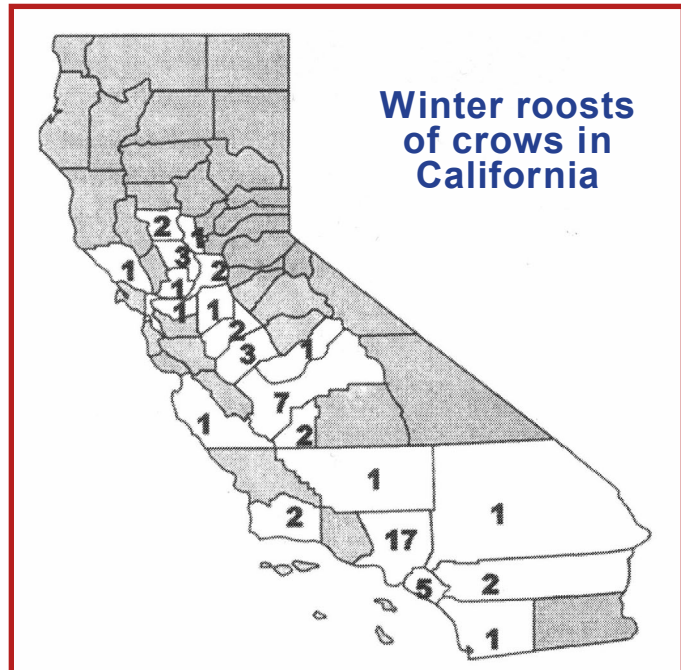
In **Kansas** in the late 1970s–1990s, crows began roosting in Wichita (52,000 in the 1983 and 100,000 in the 1996 CBC). As the trees matured in Hutchinson, Newton and Lawrence, the size of the roosts grew. In the country, crows were roosting in deciduous catalpa groves. But since the 1950s, these trees had been removed l18. When we change the landscape, the crows respond in the only way they know how.

Prior to the slight decline of crows from West Nile virus, the survey generated a feeling that crow populations in cities were increasing g46. This was also shown to be the case in many Breeding Bird Surveys (BBSs) across the country. Crows roosting in cities may be due to changes in human behavior along with that of the corvids.

**S**o much for this abbreviated tour of crow roosts in the United States. Depending on where you live or travel, finding a courage of crows is always an exciting experience. If you go to **crows.net** and click on Roosts, you will generate a map of North America

showing a small fraction of the winter roosts of American Crows, and brief anecdotal descriptions on them. You can add your location and description of a roost.

With enough money, you can use weather



**557.** In the white counties, 1–17 are the number of winter roosts that urbanites or farmers complained about in a 1999–2000 survey. Los Angeles County had 17 roosts g46



American Crows gather in several large assemblies as sundown nears. The crows move from one location to another as they organize themselves before heading to a roosting site in southern **Ontario** on 11 December 2011





**WOODSTOCK, ONTARIO** American Crows assemble in bare deciduous trees as they slowly move toward their overnight roost, 10 December 2011

surveillance radar images to locate large roosts of crows. They were used with success in finding 33 pre-migratory roosts of Purple Martins, *Progne subis*, in the eastern United States. By looking at images from 06:00 – 09:00 hours, it was possible to get the distinctive ring (360°) signature, extending from a roost at dawn. Verification of roost locations on the ground was necessary, and was usually done by volunteers from local birding groups. Internet by Weather Services Inc (WSI) at [intellicast.com](http://intellicast.com) usually updated their images every hour. For more detailed imagery, and for a monthly fee (\$1,000) to a provider of NEXRAD Information Dissemination Service (NIDS), images can be obtained every 5–10 minutes <sup>39r</sup>.

The Autumn night is clear  
After the thunderstorm.  
Venus glows on the river.  
The Milky Way is white as snow.

– Tu Fu r47

## Canada

Canada, the crown of America, is also a legitimate but not legendary place to observe roosting

crows. **Ontario**, my province of youthful residency, had four major winter roosts in the 1980s at Essex, Chatham, Hamilton and St. Catharines, each with over 5,000 crows. Later, another roost formed at Woodstock. Recently, there was a report of a roost in Ottawa. I had the visual pleasure of visiting the first four roosts in the mid-1980s, and a newer roost at Woodstock in late 2011. The roosts were named for the city or town they were associated with. An early 1950s book on the birds of **Ontario** mentioned some crows remained overwinter, and in considerable numbers in Essex and Kent Counties. No mention however, was made of any specific roost location <sup>08s</sup>.

### The Essex roost (42.17°N; 82.81°W)

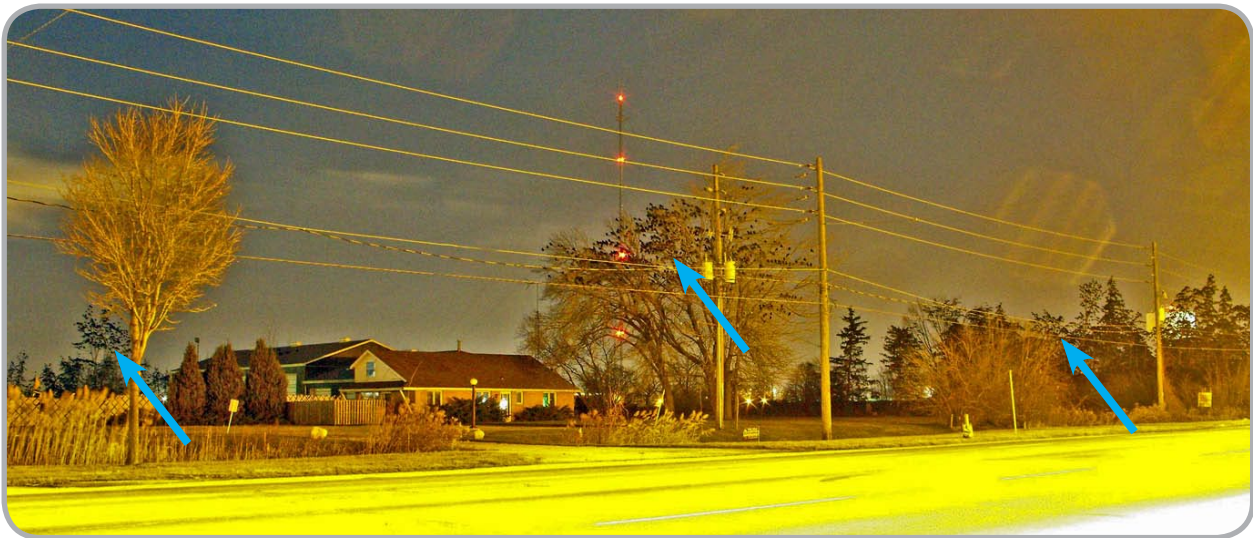
The town of Essex **Ontario**, (human pop. 20,000) is surrounded by the flat agricultural fields of Essex County. In the 1980s the town and surrounding area hosted Canada's largest crow roost – an estimated 100,000 birds at its peak. Most of my field work took place at this roost. It was a magnificent place of worship (**Maps 561 and 562**).

A 2011 email from the CAO of the town of Essex mentioned that the crows left the area about 5 years earlier. At his suggestion, I contacted Phil Roberts, their crow control officer who informed me the crows were harassed so much they finally decided to join forces with crows at the Chatham





**559. SOUTHERN ONTARIO** Locations of 6 large wintery crow roosts (X) at Essex, Chatham, Woodstock, Hamilton, St. Catharines and to the east in Rochester, New York that I visited in the 1980s, 1990s, and 2011, © online map



**CHATHAM, ONTARIO** Crows slept in deciduous and coniferous trees after sunset at the roost in the western part of the city along Richmond Street near Bloomfield Road, south of the Thames River. The house is for sale. The blue arrows point to trees filled with crows for the night of 8 December 2011. Aerial location of this roost is on Google maps, pages **563** and **564**





**CHATHAM, ONTARIO** About 2 hours after sunset, American Crows, on a calm night, roosted in trees and shrubs, homes, and on a snow-covered frozen river. © P. Allen Woodliffe, with permission

roost. With no crows banded or radio-tagged, this switch to a nearby roost was speculation. In 1990, portable propane bangers with timed explosions were tried. The roosting population at Essex was then estimated at 70,000 birds. To the northeast, the Chatham roost held about 23,000 crows. In the late 1990s both towns hired wildlife control specialists to take on the crows. The number of crows fluctuated widely each year. Essex went from 16,000 in 1999 to 117,000 in 2000, then declined slowly to 5,000 in 2009 to none in 2010. Meanwhile, at the Chatham roost, in 1999 there

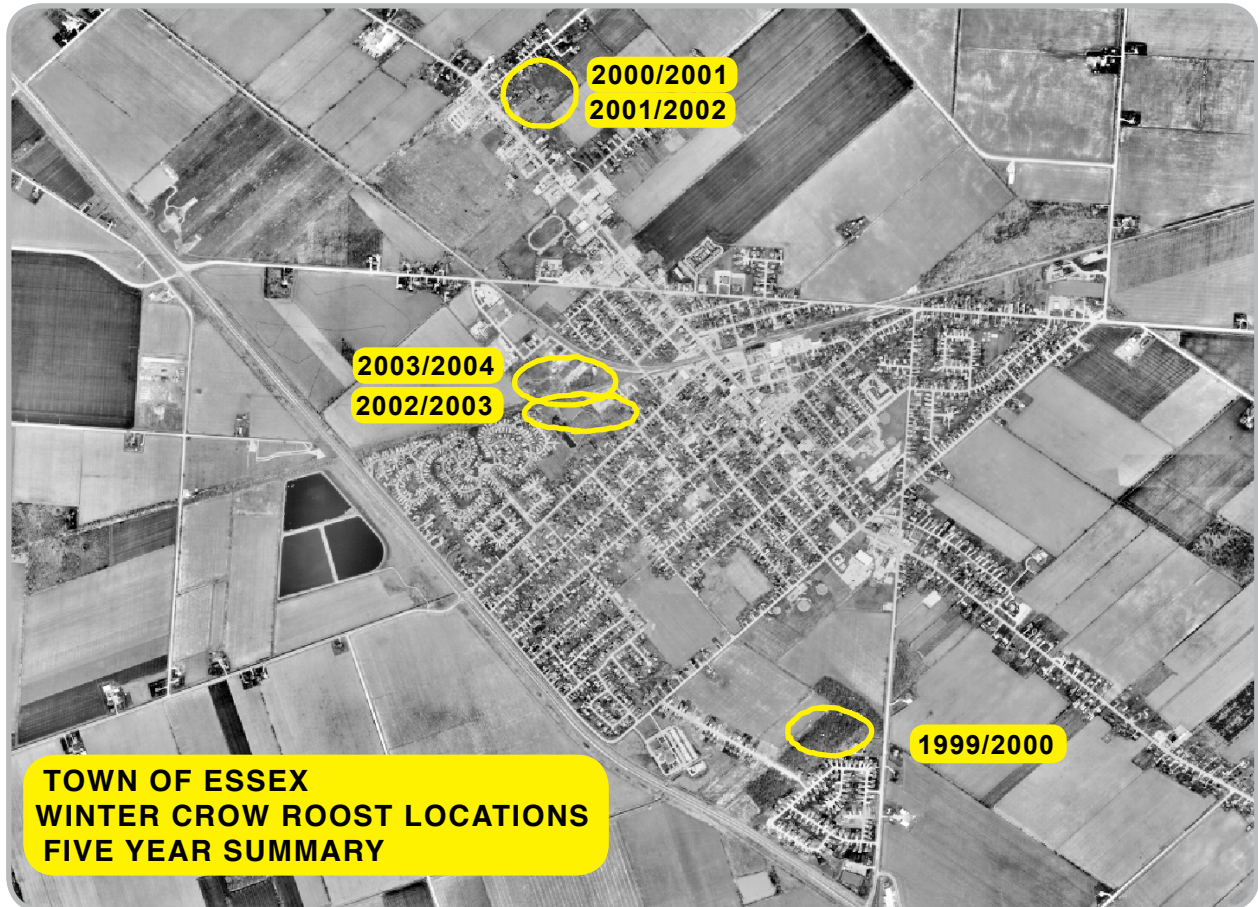
were 200,000 crows which gradually dropped to 60,000 in 2007. When I visited the Chatham roost in December of 2011, the crows seemed in great spirits and numbers.

**The Chatham roost** (42.40°N; 82.18°W)  
Only 60 km to the northeast of Essex lies the city of Chatham (human pop. 60,000) **Ontario**, home to about 6,000 crows in the 1980s. In the 2000s the wintery roost became much larger, perhaps larger than the Essex roost. My first view of the flock came on the morning of 10 November



**CHATHAM, ONTARIO** About 2 hours after sunset, American Crows roosted on a snow-covered frozen river. They face in different directions on a calm night, Enlarged from above, © P. Allen Woodliffe





**561. ESSEX, ONTARIO** Four locations of roosts of American Crows in winter over the 5-year period 1999/2000 – 2003/2004 around the town. Photograph and roost locations courtesy of Phil Roberts, with permission. When I studied crows in the 1980s, they roosted at the 1999/2000 bush

1985. Captivated, I remained in the city for the next 24 hours while crows entertained me. Their roost was centrally located behind the WMCA. Along the south shore of the Thames River, the birds slept in a dozen large cottonwood trees. My second visit came over a year later on 28 December 1986. By then the roost had shifted 1,800 m farther west, but was still in the vicinity of the Thames River and within city limits. A recent visit on 9 December 2011 witnessed about 50,000 crows roosting in the southeastern part of Chatham in trees and on the ground in a light industrial area (**Maps 563 & 564**).

**The Woodstock roost** (43.13°N; 80.74°W) Currently there is a large wintery roost at Woodstock **Ontario** (human pop. 38,000) which appears to have started in the late 1990s or early

2000s. It was visited by me for the first time on 10 December 2011. The 50,000 crows roosted in the dark at the Brick Ponds Wetland Complex, a 32-hectare site of ponds and deciduous trees devoid of lights in the south-eastern industrial section of the city (**Map 565**). If not harassed, the crows may roost in this quiet, dark, natural area for decades.

**The Hamilton roost** (43.24°N; 79.88°W) As the crow flies, my next stop was in Hamilton **Ontario** (human pop. 500,000) at the western end of Lake Ontario. Crows assembled and roosted along the north-facing treed cliff of the Niagara Escarpment, or flew from the escarpment into the city's core to sleep for the night (**Maps 551 & 552**). This was the only location in Ontario where I could gaze *down* at 7,000 crows perched





**562. ESSEX, ONTARIO** The T-shaped deciduous woodlot, Tulle's Bush (yellow arrow), used by roosting American Crows on the edge of the town in Essex County. During the 1980s, the subdivision through which the arrow cuts did not exist, nor did Woodview Drive, which bisects the south end of the woodlot. The crows roosted in a small part of the woodlot but shifted about nightly. The new subdivision beneath the arrow was farmland where the crows occasionally roosted on the ground, © Google Maps

30–200 m away in bare deciduous trees. The city below increased in complexity as the lights, complemented by the rising darkness, grew more intense. Crows, in groups of a few hundred, broke from the cliff and swirled over the city. Between their beating wings the lights of the city flickered like distant stars. A feather passing in front of a tiny street light was all I knew of their existence. At the end of a day it was a final visual whisper before I left for home.

**The St Catharines roost** (43.15°N; 79.24°W)  
The location of another roost of moderate size

came to my attention from the first published description on its 6,000 crows sleeping within the city limits of St. Catharines **Ontario** (human pop. 124,000) <sup>k79</sup>. This prompted two visits to the city for a glimpse of its crow life at night. I was not disappointed. In mid-January 1985, I found the crows roosting north of Bradley Street near Dundas Crescent. In November 1985, they slept in a small thicket of low, deciduous trees behind Kimberly Clark of Canada Limited. These locations were different from those indicated in the article by Knapton and Maturi <sup>k79</sup>. Their estimation of 6,000 crows was similar to mine.





**563. CHATHAM, ONTARIO** Pink arrow at a rectangular soybean field and trees used by an estimated 50,000 crows roosting on 9 December 2011 on the outskirts of the city. © Google Maps

### Elsewhere

Jetting to the Atlantic region, where the heaviest crows strut, a roost of 27,000 birds occupied Boot Island **Nova Scotia** <sup>25m</sup>. Additional roosts were reported at Wolfville (18,000 crows), at Kingston, and at Smith's Cove by Phillis Dobson (pers. comm. 1984). These roosts in Nova Scotia were concentrated along the Bay of Fundy and in the Annapolis River Valley, a lush agricultural area.

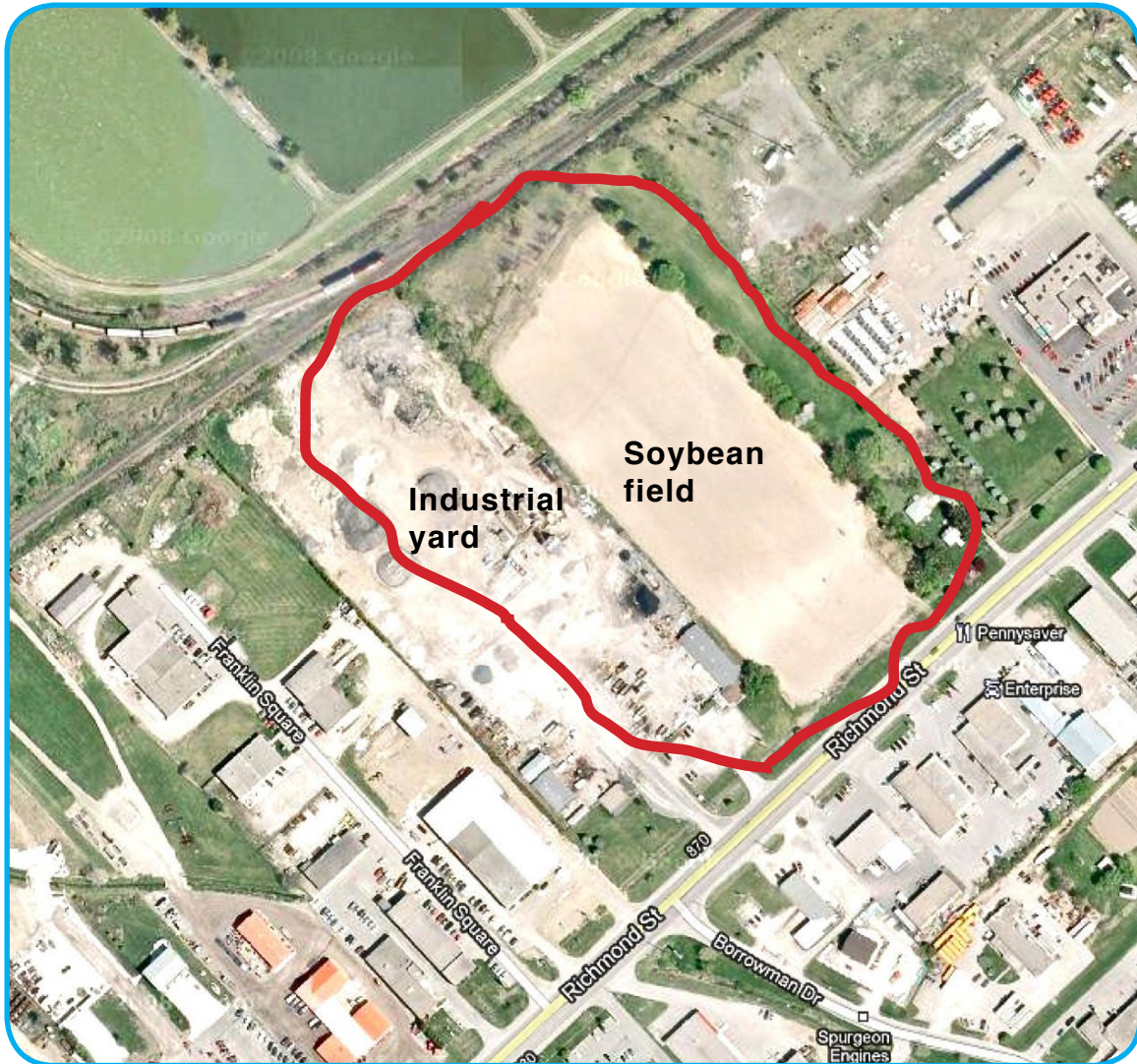
### Two banding studies in New Jersey

Movements of American Crows on and off the family's territory were studied by banding a small number of birds.

In the late 1980s around Rutgers University in New Brunswick **New Jersey**, 11 American Crows (AHY) were fitted with radio transmitter packages that weighed 8–15 grams per bird. As a means of identification, some crows had their primaries or secondaries bleached in a distinctive pattern. Their roosting and feeding behaviors were noted from November–February by Stouffer and Cacamise. The crows were divided into two groups –

- (1) birds in 3 stable groups that usually returned daily (89% of 273 location attempts) to a farm to feed over the winter
- (2) vagrants that did not follow a regular daily





**564. CHATHAM, ONTARIO** Red outlines the general area used by an estimated 50,000 crows that roosted on 9 December 2011. The tan rectangle is a soybean field that a few thousand crows used as a post-roosting assembly area in the morning prior to leaving the roost. The industrial yard next to the soybean field with piles of gravel and machinery is where many crows roosted on the ground. Crows also slept in deciduous and coniferous trees, © Google Maps

pattern

Damage to some antennae hindered the study. For the 3 stable groups, each with about 5 birds (but not all members of the group marked), the territory sizes were 0.26, 0.38 and 0.49 km<sup>2</sup>. Birds in adjacent territories using the same foraging area maintained a distance of 50–100 m. Territorial disputes did not begin until March. One crow of a group (91% of location attempts) switched groups but no aggression was observed.

Time spent foraging occupied 15–21% of their daily activity. This percentage of time is probably close to the percentage of their body weight that crows eat each day.

The grouped stable crows at first roosted with about 500 crows, 14 km from the farm. After 12 January the grouped crows roosted 18 km away on **Staten Island** New York, with about 5,000 crows. Grouped crows were located at communal roosts on 84% of 145 location attempts. Trees at the roost were mostly Red Maple, *Acer rubrum*,





**565. WOODSTOCK, ONTARIO** Yellow line encloses the general location of the crow roost in the Brick Ponds Wetland Complex on 10 December 2011. © Google Maps

3–8 m tall. A few Fish Crows, *Corvus ossifragus*, joined the roost. Assemblies formed at several locations within 0.5 km of the roost. With a normal flying speed, the grouped crows leaving the Staten Island roost should have taken 21 minutes to reach the farm but took 50 minutes, leaving 30 minutes for stopping. The flight back to the roost from the farm began between 13:00–14:40 and contained an additional 100 minutes used for stopping or other activities, such as visiting a landfill along the way (to and from the farm and

roost) or assemblies prior to entering the roost at dusk. They did not fight over placed food (eggs) and took turns eating them.

Birds in the same stable family group rarely travelled together from roost to their communal feeding area on the farm, but arrived at the farm within a short time of each other. Sometimes a bird from one group was located on its own at the landfill.

Four radio-tagged vagrant crows exhibited different behavior than did the stable grouped





**CHATHAM, ONTARIO** Deciduous trees carry the weight of thousands of crows at the roost each night in winter. Some crows roosted on the ground, 9 December 2011. *Phragmites* (foreground ) in a ditch catch the light from passing vehicles

crows. They were not regular in their movements. They switched feeding sites fairly often and fought with other flocking crows over eggs. Vagrants were more difficult to locate during the day (32% of 66 location attempts) because they fed at landfills at all hours. At communal roosts, 71% of 58 location attempts were successful in locating the birds. Over the winter the researchers lost contact with the four vagrant crows at a rate of about one bird per month. They may have been migrants or dispersed birds from a natal group looking for mates or a new group to join. One vagrant slept alone in White Pines, *Pinus strobus*, about 8 km from the farm on 5 nights <sup>72s</sup>.



Tree split by the weight of crows at the Essex Ontario roost

Several years later the movements of 21 radio-tagged crows were studied for two years in the mid-1990s at Rutgers University in **New Jersey**. The tagged crows belonged to several families and some of the results were similar to the earlier study. Nesting crows were faithful to their territories over summer, but during the winter many left the territory where they nested to roost with about 10,000 crows 18 km away at the southern end of Staten Island.

Crows began daily movements toward this communal winter roost in the early to late afternoon, depending on distance and cloud cover. Generally, they fed along the way and formed large assemblies of crows in trees and fields 1–3 km from the roost. They may or may not feed at assembly areas. On their breeding territories during the day in winter, the crows generally stayed together as a family group. In the morning when each family member left the communal roost, they arrived on their day territory alone, but formed their small family groups during the early part of the day. Sometimes a crow or two was absent from the group for days or weeks before returning to the family. When the birds left their day territory, on average about 7 minutes apart, and headed back to the communal roost in





A dead juvenile crow in the morning in an industrial yard in Chatham **Ontario** where thousands roosted on the ground overnight on 9 December 2011, with temperatures slightly below freezing in a light wind

the afternoon, they travelled alone and often fed at a landfill 4 km to the east on their way to the large overnight wintery roost on **Staten Island**. They arrived at the roost about 15 minutes apart, indicating they did not behave as a group when away from their day territory. Each crow in the group stopped and fed on its own time schedule and among different crows. And members of the family chose separate locations within the roost to sleep. By mid-April, crows occasionally roosted at the communal roost, but mostly they roosted on their breeding territory. When crows fed at the landfill, in 110 of 125 (88%) observations, they continued on to spend the night at the communal roost. Only 12% of the time did they make the 4 km flight back to their home territory for the night. When crows were not located on their group territory in the harsh light of winter, 31% of the time

they were found feeding at the landfill 4 km away, where food was more abundant c06.

If we look at our own families in the early 2000s, some similarities with the crow culture described above are obvious. Our family unit of 5 people (2 adults, 3 juveniles) shares an evening meal then sleep together in the same roost (house) each night throughout the year. During the day each member goes their own separate way to school and to work where we associate with a variety of people of different status, only to return home each evening to roost. Occasionally we may leave the family group for a few weeks to go on holidays far away and then return with new stories and still photographs to highlight our adventures.

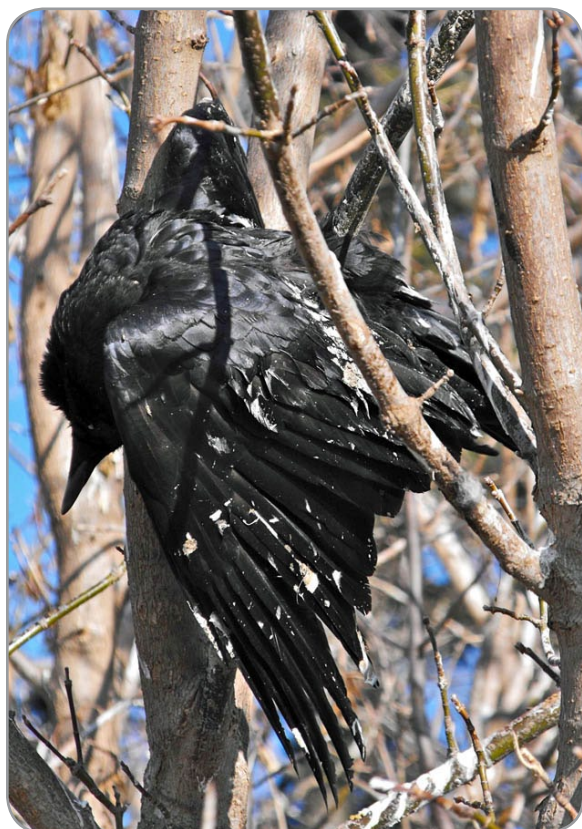
## Christmas Birds Counts (Canada)

From several CBCs, which may or may not indicate a roost, two northerly cities, Thunder Bay and Ottawa in **Ontario**, held an average of 300 and 500 crows respectively during the winters from 1976-'83 w<sup>54</sup>. Presently, there is a fairly large roost at Ottawa Ontario



A magnificent crow returns to the soil in a harvested soybean field in Chatham **Ontario**, 2011. I located ten dead crows at the roost in 2 mornings after the birds left to feed. All dead birds (not all fresh) were juveniles, based on the ragged tips of their tail feathers





Dead crow found dangling from a deciduous branch during an early morning walk through the Chatham **Ontario** roost after the crows had left to feed in surrounding farmland, 10 December 2011

(from 8,000–11,000 total in the Gatineau-Ottawa CBCs over the last few years, online). **Hamilton** presents an unusual situation. The increase in CBC figures for crows may actually reflect an increase in roosting birds in the downtown part of the city. Before 1955 less than 10 crows were usually reported in the CBCs. By the early 1960s, several hundred crows were counted, rising to 2,700 in 1967. From then on, through the 1970s and 1980s, 3,000 to 4,000 crows were the norm for a CBC in Hamilton Ontario.

The closest CBC to the large Essex crow roost was at Point Pelee National Park. Consequently, no early records existed on its development, size, location or duration. Not until some initial observations were made at the Essex roost, in the early 1980s, was it documented <sup>W53</sup>. At the time, it was probably the largest, most significant roost in Canada. Yet no birder or ornithologist

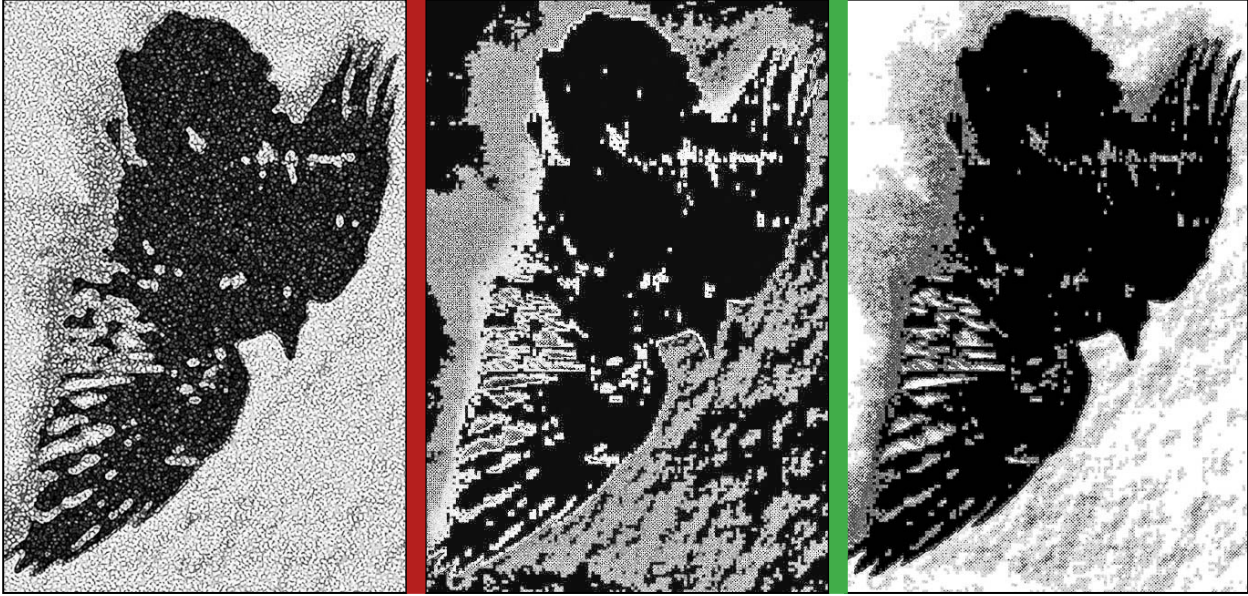
thought the roost was worthy of a study or report, so strong is our general disgust of the crow based on myths perpetuated by various media. All of my observations at the Essex roost in the mid-1980s were made when the crows slept in or near Tulle's bush within the eastern limits of the town of Essex. In the early part of January 1988, I received word the crows had shifted their roost 3–4 km south of the town of Essex. The data in this ebook on the Essex roost were gathered before the shift in 1988.

In eastern Canada, at areas with rivers and ocean, CBCs in **New Brunswick** yielded 100–300 birds at each of Fredericton, Moncton, and Saint John. The Canadian Prairies, according to published reports, did not host large wintery roosts. However, one autumnal roost of 70,000 crows formed in Saskatoon, **Saskatchewan** <sup>933</sup>. This was probably a temporary roost as the crows migrated south for the winter. There were roosts of less than 200 birds in Saskatoon, from mid-August into early October <sup>37h</sup>. Towards the Pacific flows the Fraser River. At Chilliwack, **British Columbia**, 90 km from the river's mouth, about 900 crows were included in the 1979 CBC.



Dead juvenile (notice the tail) crow stuck in deciduous tree at the **Chatham** roost, December 2011





Three versions of a crow frozen on snow during a walk at the **Essex** roost one clear morning

#### Outside

My window now I hear the rain  
Rattle on the banana trees.  
Each beaten leaf contains  
Ten thousand pains.

– Chu Shu Chen r47

With these roosting locations and crow numbers dancing in your head, it is difficult to imagine the impact 100,000 or more crows can have on an observer. The physicality of thousands of crows in one spot produces quite a dilemma. In an age of dropping numbers and disappearing species, how does one react when suddenly confronted with an enormous courage of crows. In some ways, it is like trying to describe a large, abstract painting by Helen Frankenthaler (1928–2011) to someone who has never seen one. What level of awareness should I work at? What level of awareness can I work at? Details are needed, but even in quantity, they do not constitute the whole.

In the air the permutations of crows at a large roost are endless. I was humiliated and intimidated by the performance of crows as their roosting theatre developed before me. To translate their magic, power, sound and movement into our recently evolved language was a hopeless task. It

was enough to stand at the scene and let myself cross over into a new threshold, to forget who and what I was, and let the crows take control. For an hour it was something to experience quite apart from the measure of science. It was a play of feathers against the wind; a black intelligence of wing and voice piled in layers, one upon another – compelling and unabridged.

### Why do crows roost?

**R**adio-tagged European Starlings, Common Grackles and American Robins shared a communal roost from June–November 1987, in **New Jersey**. The birds were post-breeding adults. Overall, predation rates were very low and individual birds selected a roost based on availability of nearby food. The 17 tagged birds (all 3 species) were observed for more than 40 days. For the 3 species, 133 individual birds switched roosts, but only changed their daily feeding / activity centers in 5 cases. Roost sizes also varied with the time of year, which coincided with a shift in dietary items (invertebrates to plants). Large and small roosts were active at the same time and roost switching by the 3 species was common. We don't know why birds switch roosts. Most roosting sites were within 3 km of their daily





feeding / activity sites 57m.

The three main reasons for roosting, from our limited understanding of wild animals, includes the 3 theories below. Individually and in combination, they have not proved adequate or necessary for a highly social animal like the American Crow. But since we like to think we know what we are talking about, here are the standard three reasons that appear in academic journals –

### (1) THERMAL

Like children, some adults continue to question our behavior and that of crows. These evening gatherings of birds prompted researchers to wonder if there was a temperature advantage. Grants were received and studies undertaken. A flock of about 7,000 Jackdaws slept in deciduous trees in central **Sweden** <sup>990</sup>. In **Israel**, researchers spent their nights with 5–8 million starlings that roosted in clumps of reeds, pine and Cypress trees <sup>Y15</sup>. Finally, in eastern **Washington** state, a small band of 28 American Robins, which roosted in a Douglas Fir grove, were monitored <sup>w09</sup>. From these three studies it was concluded there was no real or substantial thermal benefit for the birds, whether they roosted in a town or in the country. Since some of the Jackdaws and starlings regularly flew more than 30 km twice a day from the



Compton Tortoise Shells overwinter as adults

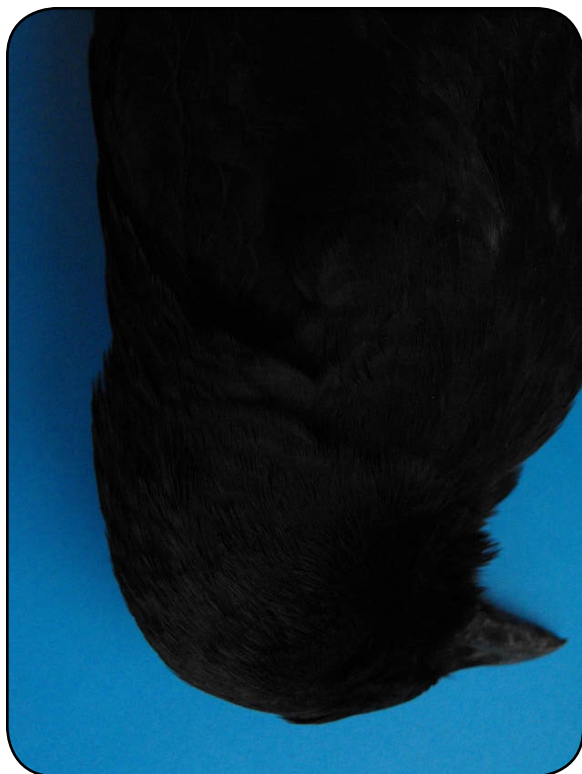


American Crows working a cornfield after the harvest. Waste corn and insects are eaten

roost to feed, the energy used for this flying was not gained back by the slightly higher ambient temperature at the roost. Crows and other bird species may form roosts for other reasons. But wait – 18 American Tree Sparrows were huddled together under snow on a cold afternoon in southern **Ontario**. This indicated there may be a thermal advantage to flocking in some instances <sup>08m</sup>. Perhaps the sparrows were huddled like 20 people crowded into a bus shelter while waiting for the next ride. However, as no large communal crow roost is located under a blanket of snow, or inside an empty building, the analogy with the sparrows lacks pertinence.

Back to the crows. Sometimes flat rooftops were the medium on which crows chose to sleep. Perhaps there was a slight amount of heat escaping through the roof. But this was only speculation; it could just as well be a simulation of ground roosting that was unavailable to crows roosting downtown. Not all crows in a flock settle onto roofs, many remain in trees ([see page 560](#)).





A dead American Crow

Nightfall. Clouds scatter and vanish.  
The sky is pure and cold.

– Su Tung P'o r47

Even though a city's temperature is generally a few degrees above that in the country, crows sleeping in a city are interrupted by mettlesome people that yell, clap their hands, shine lights, make cat-like calls, turn on sirens, honk horns, and let their unleashed dogs flush crows from trees. Crows were usually deprived of some of their sleep. Crows often roosted in exposed windy tree tops, but not always in the tallest trees. Bare deciduous trees in use were well spaced along a street or clustered near buildings or squares. Conifers were occasionally used. In Hamilton the roosting flock of several thousand were often scattered over a 1–2 block area.

Yellow-billed Magpies, *Pica nuttalli*, roosted in Sacramento **California** over the winter of 2003

and into the spring of 2004. Birds from eight small roosts slept in a total of 18 plant species. Five comparative roost measurements –

mean canopy cover 94 (91–96) %  
mean height of vegetation used 10 (5.7–17.6) m  
mean height of magpie perches 6.5 (4.2–11) m  
mean distance to water 50 (0–106) meters  
mean estimated maximum number of magpies per roost 237 (7–879)

Deciduous vegetation was used for sleeping only when leafy. Magpies roosted in the upper third of all vegetation. With ambient temperatures ranging from –4 to +12 °C, the mean difference between the microhabitat temperature at a roost compared to a nearby potential roost site was 0.7 °C 48c. Although this temperature difference was deemed statistically significant, I doubt if it meant much to the magpies. They can't be that wimp-



Christmas Bird Counts in cities (**Toronto**) and the country throughout North America are an annual event that Frank Chapman began in 1900. Volunteer birders make their counts each winter





ish. Pairs of breeding Black-billed Magpies and American Crows that maintain territories all year in Winnipeg **Manitoba** sometimes slept in  $-35^{\circ}\text{C}$  air (plus windchill) in January, without complaining.

In the 1890s W Harvey McNairn mentioned crows in Toronto **Ontario** being blinded from “excessive coldness” 2b4. I suggest an eye disease was probably responsible, since Toronto is well south of Winnipeg.

icy water with the air temperature a few degrees above freezing. They enjoyed the icy bath water and certainly didn't die because of a little shit on their feathers.

Another behavior by roosting crows is sleeping on the ground. Apparently, roosting on the ground is more likely to happen on very cold or windy nights in winter. Crows at the very large Fort Cobb roost in **Oklahoma** roosted on the ground during cold, windy nights, and on lake-ice



A communal winter roost of Rooks kept Swingland busy. In normal weather, adult birds occupied the top part of a tree, which was a warmer but windier position. Adult Rooks forced younger birds to roost beneath them. Swingland found “the height of the roost perch and social status were significantly correlated.” A roost was structured so the majority of Rooks survive by experiencing the least amount of energy loss at night. This took place at the expense of a few that suffered from the weather and perhaps died 0s2.

Crows sleeping on lower branches may have shit dropped on their feathers from an upper layer of crows. Experimenting with caged starlings, it was discovered the uric acid and other fecal material lowered the water-resistant qualities of their plumage. Death occurred within 30 minutes after they were sprayed with water in an ambient temperature of  $17^{\circ}\text{C}$  Y16. Again, this seems odd. I have seen crows in the spring and fall bathing in

south of the woods where they usually slept i01.

Contrary to the crows in Oklahoma, I have watched the entire Essex **Ontario** flock of crows settle onto the ground for the night when the temperature was about  $-10^{\circ}\text{C}$ ; and another time when it was near  $0^{\circ}\text{C}$ . Crows roosted completely in the open on a calm cold night, appearing like an ink-blot on white paper as they slept on a snow-covered ploughed field next to the woodlot the birds normally used (**Photo page 596**). Once, with a temperature above freezing, part of the large flock of crows were perched in rows, one crow on the top of each broken field corn stalk in a flooded field in late winter near the woodlot where more crows slept in trees. Although my observations at the Essex roost were few, it seemed very cold and / or windy weather did not force crows to sleep on the ground. In general, warmer winters mean more wintry roosting crows, with a 5% higher annual avian abundance for each 1%





increase in mean annual temperature <sup>105</sup>.

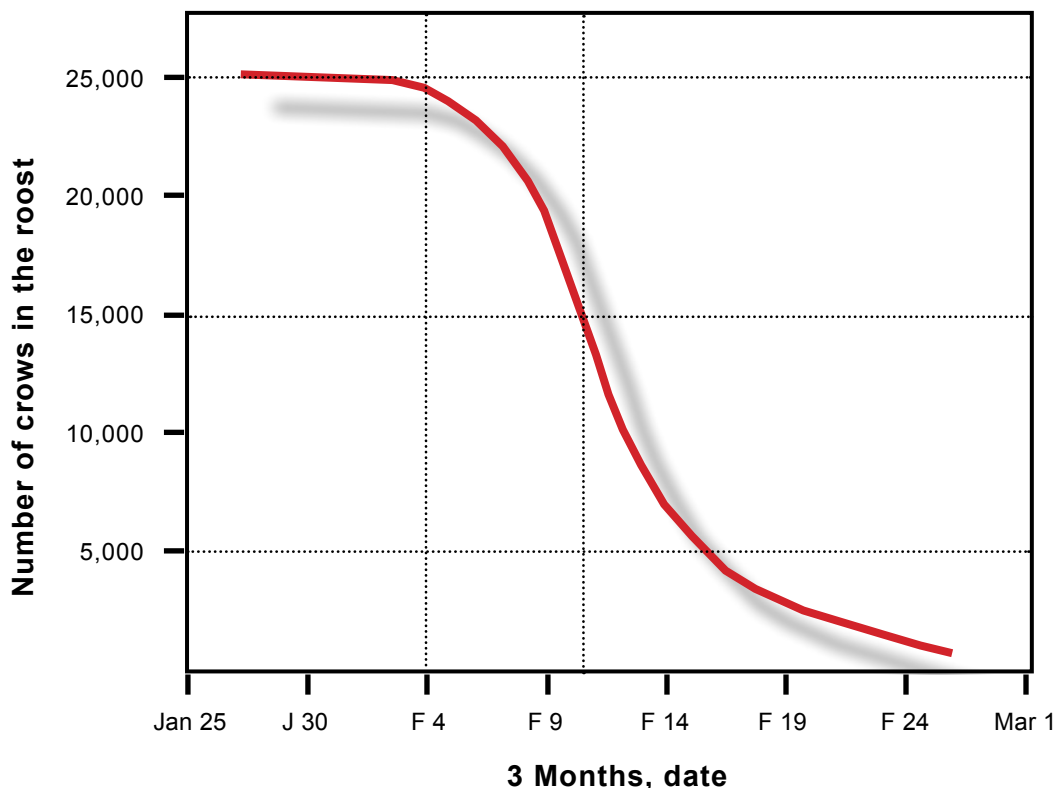
The use of a GIS – geographic information system – may be helpful in understanding where crows choose to roost in winter in cities, and where they might form a roost if disturbed from their present roosting location. Working within the city of Woodland **California**, roosting and non-roosting trees were compared. Six GIS layers were formed with help from city departments –

1. Roost trees
2. Street trees
3. Traffic flow
4. City streets
5. Land use
6. City boundaries

Summer, year-round, and winter roosts were examined. Measurements of trees were taken at 87 crow roosts and 62 non-roosts – size and type of tree used, locations of roosts, substrate

beneath roosts, and vehicular and pedestrian disturbances, which differed from summer to winter. Four variables were entered into a model – tree species and size (dbh), substrate, and disturbance index. From these data, the model was able to identify 87% of the roosts and 82% of the non-roosts <sup>945</sup>. Based on another study I read, local levels of ambient light at night would have been another useful parameter to measure and include in the GIS equation.

In this urban study, crow roosts were clumped into a 1.2 km<sup>2</sup> area. The 22, year-round roosts were in commercial areas. Nineteen (95%) winter roosts were also in commercial areas. The roosts in winter (63%) were in partially treed parking lots of shopping centers (well illuminated) and other businesses. Summer roosts (86%) were in residential areas adjacent to commercial areas. Twelve (71%) of the 17 evergreen trees identified as possible candidates for roosting trees were actually used. The GIS system was rather costly and



**573. OHIO** All through February the 25,000 American Crows continued to depart steadily from a winter roost in central **Ohio**. By early March the roost was no longer resplendent with crows <sup>934</sup>, © E Good and the Ohio State University





complex to install and maintain, but the results were easily communicated to the public and professionals, and could be useful to shift the urban roosting patterns of crows in our favor (whatever that means).

## (2) PREDATORS

A second theory, which may explain the roosting behavior of birds, was protection against predators. When a hawk approaches a feeding flock, the birds rise into the air as one. The changing tight pattern is thought to keep a predator from focusing on one bird to make its kill. At night, thousands of crows sleeping in trees probably do not react as one because a predator in darkness would not be seen by the majority of birds. It should be mentioned that no one has actually done field work to determine if a large roost of crows attracts or repels predators. At large roosts (over 50,000 crows) I have visited, there are always a few dead crows (probably not killed by predators) on the ground and stuck in trees in the morning. Yet very few are fed upon where they die. Perhaps some are carried away by mammalian predators before being eaten. Non-human predators appear no more prevalent at a roost of crows than elsewhere. Hawks were not perched in trees at a roost in the morning or flying overhead ready to dine on those that died at night to grab a fresh flying or perched crow for breakfast.

Even as crows slept completely exposed and visible on a snowy moonlight field few predators were attracted. On one morning, while walking through the open roosting area after the birds had departed in the morning, three severed heads of crows lay on the snow – probably the work of a Great Horned Owl on its nightly shift.

Some birds in a large roost are awake and may detect predators to the benefit of the entire flock. With crows, the number of birds awake in a flock is correlated to the size of the flock. A pair of birds roosting on their territory in town are

quiet as soon as they enter their roosting tree 1–2 hours before sunset. A roost of 10,000 members was generally quiet except for a few calls during the hour after birds settled into trees. Two million crows at the Fort Cobb roost in **Oklahoma** continued to “quarrel throughout the night” i01.

There are ecological factors that may enhance the formation of flocking. From the analysis, flocking for predator avoidance was of much less importance than feeding opportunities, although not everyone would agree b67. Finding and feeding on dispersed prey was the main reason why birds formed flocks. For the American Crow, this took place in the summer, when the family unit foraged as one on their territory, once the young fledged and were feeding on the ground as juveniles. Family members are in competition with each other as parents feed themselves and the juveniles. Slowly the juveniles are taught and learn how to feed and become self-sustaining. This leads to the most fascinating theory behind roosting.



## (3) INFORMATION

In this theory, first mentioned by Ward and Zahavi in the 1970s, assemblies and roosts were envisaged as information centres that helped birds locate food. It was mentioned “there is no obvious correlation between food-type and roosting habit, nor is there any restriction of communal roosting behavior to particular habitats or regions.” In short, a variety of birds, ate a variety of foods, and roosted in many diverse locations. And the habit of forming large roosts was widespread. Regarding predation at roosts, there was “no evidence that any species has evolved communal roosting to gain greater protection from predators” w20.

Before I delve any deeper into the information theory, you should realize the idea of roosts as communication centers is not a modern one. Early crow watchers suggested the calling at a roost had meaning. From *American Natural History*, a book by Godman in 1830 –





The trees adjacent and all the shore would be literally blackened by those plumed marauders, while their increasing outcries, chattering and screams were almost deafening. It certainly seems that they derive great pleasure from their social habits, and I often amused myself by thinking the uninterrupted clatter which was kept up, as the different gangs united with the main body was produced by a recital of the adventures they had encountered during the last marauding excursions.

When migrant and local crows began to form wintery roosts in autumn, food in the surrounding fields was easily located. Crops were still being harvested, and stubble fields with well distributed waste grain, mice and insects satiated the landscape and birds. A no-till farming culture kept food at the surface in some fields. Eventually some ploughing and snow decreased the amount and kind of food accessible to crows. Deep winter, it can be argued, was the lean period – a time when a roost of crows should be at its largest to take advantage of having more birds that added to the information pool of where food could be found. The autumnal start-up time for a roost gave the birds time to become acquainted with the landscape and the best feeding locations. As winter



enlarged, the uneven distribution of food made a trip to the roost necessary, in spite of the flying distance involved (30 km or more), to acquire





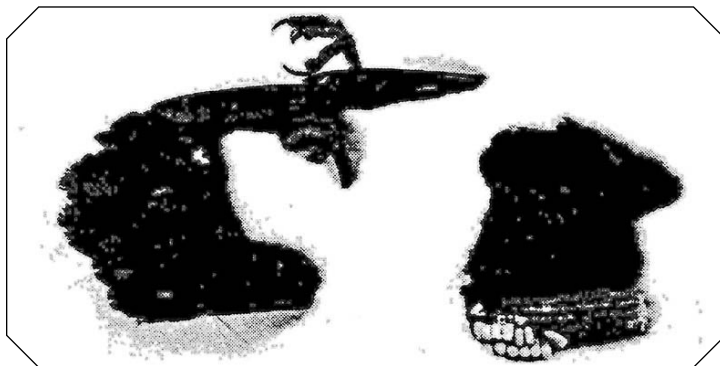
worthwhile information. And this information indicated the amount as well as the location available so the resource was not hastily exploited w20.

The behavior of crows feeding away from the Essex roost was quite diverse and difficult to fit into any one simple information theory. At the Essex roost, a few hundred crows from the

banding two groups of crows at any large roost and compare the daily short- and long-range feeders to determine age and sex, and if there was any interchange in feeding patterns between them with the passage of time over one and two winters.

In **Nova Scotia**, many juvenile crows left the

Boot Island roost just before the arrival of heavy snow in January 25m. As the snow vanished in spring the roost refilled, although spring migrants may have been responsible for part of the influx. This drop in population at a time of food scarcity appears to contradict the theory of a roost as an information center z03. However, in **Illinois** there was an increase in the population of crows from late December to February (possible including some spring migrants in the February count) due to a severe winter, which would support the information theory g53.



Sometimes a crow dies with corn for use in the afterlife

roost spent the day feeding in the town of Essex only 1 km away. They travelled back-and-forth to the roost each day instead of roosting in a tree behind their favorite fast-food outlet. Those crows that traveled 30 km or more, to and from the Detroit / Windsor area, passed over dozens of food-holding fields along the way, only to land in a similar field at the end of their long morning flight. These long-distance flights were an unnecessary expenditure of energy, except when viewed in the context of exploratory behavior or diversity of motivation – that a portion of the roosting crows might find necessary. A parallel may exist in the behavior of starlings. They preferred to search for meal worms rather than eat them directly from a handy feeding dish i11. It would be worthwhile

Cliff Swallows nest in colonies. Some observations strongly indicated the possibility of the colony as an information center. Its members used different strategies when they foraged on ephemeral, dense patches of flying insects 89b.

Field tests of the information transfer hypothesis took place at the University of Aarhus in **Denmark**. Sunflower seeds were placed less than a kilometer from a roost of Greenfinches. Comparing counts of birds at seeds in the afternoon to those the next morning, in 8 of 9 trials there was no increase in the number of birds at the seeds k40.

How information is passed among avian members at a roost is difficult to say. The three obvious ways might be flying, perching behavior,





In the lower center of this image from **Essex** County, a crow is right above an Accipiter (arrow), while more crows decorate the sky



Field corn and soybeans in fields after the harvest in southern **Ontario** provide food for thousands of American Crows over the winter

and calling. In addition there may develop a mood at a roost. When most members were well fed and happy, the mood reflected this. Those birds unable to locate sufficient food could acquire useful information on better feeding areas in relation to the roost's location. Some birds may follow a leader the next morning to improve their dining. This system appears to function altruistically, otherwise a parasitic relationship detrimental to the leaders would develop and force them to start defending their feeding areas <sup>w20</sup>. A cultural question, which has never been asked is – **Do crows ever deceive one another?** If so, the information center theory, if it exists, may only work among an honest group of crows passing on useful information to birds that really need it.

Radio-tagged Common Ravens in **New England** in 1988–1990 were released at carrion.

They lead other ravens at a roost to the new food source. Roost sites frequently changed location depending on where the new food sources (carcass) were located. Social soaring displays were used to pass on information that enabled ravens from wide areas to assemble <sup>m48</sup>. Furthermore, it may be that roosts function as <sup>m49</sup> –

- (1) a way to reduce predation
- (2) an arena for mate choice
- (3) an arena of status display

■ In the Mojave Desert, between San Bernardino and Palmdale **California**, about 1,500 Common Ravens (a large roost for ravens) gathered each evening to sleep on vegetation, including the Joshua Tree, *Yucca brevifolia*, which is at best 15 meters tall. The birds roosted nightly from 8 November to 15 December 1987, arriving singly or in small groups of less than 10 birds. On their last sleep, their calling at the roost lasted until midnight, rather than the usual 20:00 hrs (8 pm) cutoff time. The next morning the ravens were gone before dawn, as usual, but did not return. The authors speculated the extra calling may have been communication about where to roost the next night <sup>25c</sup>.

There were up to 2,100 Common Ravens at one roost along 6 km of transmission lines spanning 15 towers. In all, 13 communal roosts developed over 5 years along a longer segment of the electrical transmission line from **Idaho** into **Oregon**. Ravens roosted on the towers, usually near the top of a tower unless it was windy. Only one roost was occupied year round. Peak numbers were reached in late summer to early autumn. Ravens shifted between different roosts in a year, some up to 63 km apart <sup>e43</sup>.

During four years, 34 flock-living Hooded Crows were radio-tagged in south-eastern **Norway** to observe their roosting and feeding behavior. Food was placed in agricultural fields on a temporary basis (2 days) and at different locations. The crows roosted about 3.5 km from the food patches. When a crow was at the food on day 1, it often visited the food on day 2. A crow that had not been at the food on day 1, often vis-





ited the food patch on day 2, if it had roosted with a *knowledgeable* crow and the latter crow flew to the food on day 2. It was also noted that crows could switch roles and be a leader or a follower depending on circumstances <sup>14s</sup>.

At the Hamilton **Ontario** roost, it was possible to watch crows at close range when they roosted in deciduous trees by City Hall. Inside my warm, parked vehicle in the morning I observed calling and departing at 20–60 m distance. From a small bare deciduous tree holding about 200 unmarked crows, the departure was slow and orderly over 30–40 minutes. The crows, awake and calling, could leave in one big eruption from the tree(s) to follow a leader to a source of food, but they did not. One part of the entire roost did not appear to empty more quickly than another part, nor in

600 Carrion Crows were marked near Lausanne. There were 5 main roosts in the area. Flocks fed for 2 days in their usual manner. At a site that was likely to be used, 40 kg of ground beef mixed with dog food was put out before dawn each morning for 3 days. A lot of food was used to ensure that any birds arriving in the late afternoon would find food. At three different feeding flocks, the times of arriving and departing by all marked crows was noted. As well, the size of a feeding flock and number of marked birds were tallied every 1–2 hours. When no food was added (control), the number of feeding flocks varied little during the day and the number of crows arriving the next day was about the same.

When food was placed at a location, the number of Carrion Crows soon doubled and remained



After the majority of roosting crows left in the morning, several birds quietly linger at the site

any one direction. Crows from one tree moved out singly or in groups of 3–5 birds (family units?) in all directions. Once in the air, their direction seemed set, although there was some veering off to another compass point. Only a handful of crows shifted from one tree to another tree before leaving the roost. It was impossible for me to visually identify leaders or followers. Airborne, the crows were quiet except for an occasional note given some distance from the trees. If calling was the method of information transfer carried out in the morning, the exchange was probably made at dawn by birds still perched on branches.

In western **Switzerland** in the 1980s, over

high until dusk. The next morning many more birds arrived at the food patch and the number increased over the 3 days. On the surface this can be interpreted as information being passed on to other individuals at the evening roost, who then arrived at the food patch the following morning / day. Keeping track of the marked birds, indicated that “many birds that find the patch stay for limited periods only, and that the number of birds present at any one time does not reflect the number of birds that have acquired the information so far.” The observations could be more easily explained by the local enhancement theory. The assumption that birds at the food patch arrived early and





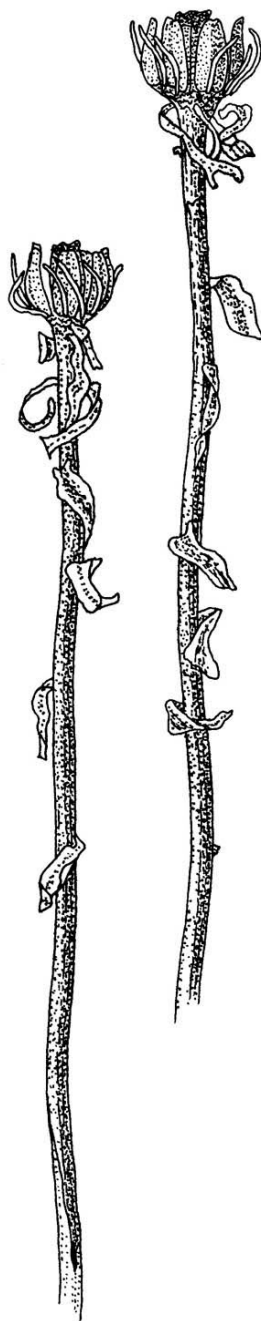
stayed there all day was false. Carrion Crows moved around throughout the day. Therefore, transfer of information at a large roost may not be the reason for the formation of the roost<sup>r67</sup>.

Another experiment I would like biologists to try is placing a huge quantity of food (enough to attract 100 crows) 500 m from a large roost along a major flyway for 7 days in a row. The experiment could have 2 parts –

- (1) food is placed along a flyway right after the roost forms in the fall when there is no snow to hide the plentiful amounts of mice, insects and waste grain in the harvested fields
- (2) food is placed near the roost after 10–15 cm of snow had accumulated on farm fields. The changes in feeding behaviour would be worth observing.

Would all of the hundreds or even thousands of crows that used a particular flyway which passed over the nearby placed food descend on the food patch? I would guess that some do, but most do not. Instead, they would continue along their morning flight path for several kms from the roost without stopping at the new rich food source, regardless of snow cover.

Information gathered and shared could also involve sexuality. Perhaps the roost is one great arena of sexual appraisal. Which crows are compatible, which can handle the cold, which crows can find the best food, which can fly the farthest each day, which are the smartest, which can command the highest perches, which are the toughest and most beautiful? At the **Hamilton** roost in early spring, a pair of crows perching close together on a branch before sunset are easily noticed in the large



Indian-pipe fruiting stalks from a productive previous summer

courage of crows. Are these a new pair, together for the first breeding season, or an already established couple, deciding when to migrate to their familiar breeding territory along Walnut Street in Owen Sound?

## Family groups at roosts

A large winter roost, of say 50,000 crows, formed at Chatham **Ontario** in mid-October. What was its composition? Do all the local crows that nested within 100 km join the Chatham roost or do some of them migrate south and join a roost in Ohio? What determines the size of the roost in Chatham, or anywhere?

The size of foraging groups of crows led some to believe “the social unit of American Crows is the family throughout the year.” The size of groups of foraging crows were recorded in **Oklahoma** for almost a year, including those associated with a tiny roost of 300–400 birds in the 1980s. Most of the crows roosted in cottonwoods along an intermittent stream and fed in rangeland within about 10 km of the roost. The average size of a feeding flock was four birds, which was equal to a pair of adults and two offspring, indicating some families remained intact over the winter. Families established winter territories and returned to them daily for varying lengths of time, which may invalidate the theory of roosts as information centers for some of the crows in attendance. Two groups of four and five crows frequented one area for over two weeks. About mid-February, flock size decreased

to about two birds, a sign pairing was becoming more intense. In May the flock size was the lowest at 1.6 birds, indicative of widely spaced nesting pairs<sup>k92</sup>.

Do migrant crows at a large roost join or develop small family-like groups that may feed at





a particular clutch of fields over the winter? About 30 crows were collected from one location at a wintery roost in Wichita **Kansas**. From electrophoretic analysis of liver or muscle tissue, the observed mean heterozygosity across 25 gene loci was 0.052, which varied little from that reported for other avian populations.

The proportion of loci where polymorphism was observed (52%) was relatively greater than the mean heterozygosity across loci above. Nearly half of the observed polymorphism (genetic variation) was because of the occurrence of rare alleles. The chief reason could be that all

the sampled crows may have belonged to a small number of local family groups. This may lead to the sampling of rare alleles. Or, local populations of American Crows may have a higher than normal number of rare allelic forms. Further testing is needed to find if distinct breeding groups, widely dispersed over the summer in the northern Great Plains, get compressed into a dense scale at a wintery roost in the mid-Great Plains, such as in Kansas <sup>97b</sup>. Local family groups in Kansas tend to remain separate from the northern flocks <sup>p68</sup>.

For the winter crow population in Champagne County **Illinois**, Black showed 42% of the birds were year-round residents, and 58% migrants. As well, juveniles made up 27% of the winter (roosting) crow population in January 1938 and 36% in 1939 <sup>20b</sup>.

## Flyways and assemblies

**T**he most noticeable aspect near a large roost are the rivers of crows passing overhead as morning and especially the more orderly evening flyways develop. If the roost site is relatively stable in location from year to year, flyways should have traditional directions and distances, and traditional crows using them. Are these flyways part of the crow culture passed on from generation to generation? Any alert hunter can place her crow decoys in a stubble field 10 km from a roost along a traditional flyway and be assured, depending on wind direction, the crows will arrive at daybreak throughout the winter. E Good reported crows flew up to 80 km from a roost to feed <sup>934</sup>. At seven roosts in **Iowa**, the averaged feeding distance traveled daily by crows was 8 (1.5–24) kilometers <sup>s33</sup>.

Flyways to and from a roost vary in intensity and duration. Smaller roosts are serviced by a smaller number of flyways. At the **Hamilton** roost of about 6,000 crows, six evening flyways were usually in operation. On Boot Island, **Nova Scotia**, 25,000 crows developed five flyways returning to the roost <sup>25m</sup>. The 100,000 crows at the **Essex** roost averaged 14 evening flyways which I located and mapped by driving a circuit 7–23 km from the roost (**Maps 584 & 585**). At the Fort Cobb roost, southwest of **Oklahoma City**,



Yellow Lady's Slippers  
and American Crows  
dream about M51

